

4B100

CORRES. CONTROL

LTR. NO.

K-H Corres. #



**Rocky Mountain
Remediation Services, L.L.C.**
... protecting the environment

Environmental Technology Site

164

Colorado 80402-0464

(303) 966-7000

Originator Ltr Log #

SLG-002-97

97 - RF -

DIST.	LTR	ENC
BARTHEL, J.M.		
BENGEL, P.R.		
BENSON, C.A.		
CARMEAN, C.H.		
DAWSON, D.		
EDWARDS, J.D.		
FINDLEY, M.E.		
FITZ, R.C.		
GUINN, L.A.		
HUGHES, F.P.		
MCANALLY, J.L.		
POWER, A.P.		
REED, A.B.		
TYSON, A.M.	X	
WAGNER, M.J.		
WHEELER, M.		

July 15, 1997

F. J. Valenzuela
Waste Certification
Kaiser-Hill Company, RFETS
Building T883C

TRANSMITTAL OF WASTE PROFILES FOR GRANULATED ACTIVATED CARBON - SLG-002-97

Attached please find, for your approval, the waste profile for granulated activated carbon (GAC) generated from several environmental restoration activities (T-3/T-4, Ryan's Pit, and the Building 891 Consolidated Water Treatment Facility). This waste stream is intended to be sent to the Idaho National Engineering and Environmental Laboratory (INEEL) for incineration at the Waste Experimental Reduction Facility (WERF). The waste profile has been reviewed by the appropriate INEEL organizations as well as Rocky Flats Waste Certification and resolution of comments has been performed. Other activities (e.g., completing shipping documents) will now be initiated to facilitate the waste shipment scheduled for late September, 1997.

The Waste Profile includes an executive summary, INEEL L-0435.10 - L0435-12 forms, and various attachments supporting the waste profile. The Generator Certifier Signature on form L-0435.10 is the only outstanding requirement that needs to be completed for approval of the waste profile by INEEL personnel. As you have indicated, Waste Certification will send the original, signed waste profile to INEEL. It is imperative that this be completed as soon as possible to facilitate INEEL approval and inclusion of this waste stream into the update of the INEEL Site Treatment Plan for mixed waste. We suggest that an express mail service be used to facilitate this transmittal.

Please submit the original signed waste profile to:

Lockheed Martin Idaho Technologies Co.
2525 Fremont Avenue
Idaho Falls, ID 83415-2414
Attention: John Harris, Mail Stop 2414

If you have any questions please call me at (303) 966-6588 or Hopi Salomon at (303) 966-6627.

Shaun L. Garner
Shaun L. Garner
Project Manager

HS

Attachment:
As Stated

RFMS RECORDS	X	X
RF CORRES. CONTROL		
TRAFFIC		
PATS/T130G		

CLASSIFICATION:

UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER
SIGNATURE:

Date:

IN REPLY TO RF CC NO.:

ACTION ITEM STATUS:

☐ PARTIAL/OPEN☐ CLOSED

LTR APPROVALS:

MCB: *MCB*
ORIG. & TYPIST INITIALS:
HS: *AW*

EXECUTIVE SUMMARY WASTE PROFILE
FOR GRANULATED ACTIVATED CARBON
A SUBSET OF PARTICULATE SLUDGE (RF-W071)

Rocky Flats Environmental Technology Site (RFETS) has generated a granulated activated carbon mixed waste stream from several environmental restoration projects. This waste stream is identified as a subset of Particulate Sludge, Site Treatment Plan number RF-W071. The RFETS Site Treatment Plan, Rebaseline, identifies catalytic chemical oxidation (a process that is currently being de-funded) as the primary treatment option for this waste. This profile is being submitted to INEEL for review and potential approval for processing at the WERF incinerator, as a new, contingency treatment option.

ANALYTICAL INFORMATION/PROCESS KNOWLEDGE

This material has been determined to be a mixed waste based on sample results and process knowledge. The waste stream consists of granulated activated carbon (GAC). The GAC originated from several Environmental Restoration based sources. The GAC was used to polish the airstream from low temperature thermal desorption units (TDUs), which were used in processing radioactive soils and debris contaminated with VOCs. Other GAC originated at the Consolidated Water Treatment Facility (CWTF) where it was used as a final organic polishing step on treated wastewater originally generated from various ER activities including condensate from the TDUs described above.

Some of the soil and drums originally treated in the TDUs contained VOCs from listed sources (F001 and F002 - Ryan's Pit Project). Treatment residuals (e.g., GAC) would therefore be considered hazardous via the RCRA derived from rule. In addition, some of the treated soil and drums contained VOCs that did not originate from listed sources (Trenches T-3 and T-4 Project) and were evaluated with respect to their RCRA characteristics. Samples from this GAC exceeded select RCRA TCLP standards (TCE and mercury), and contained slightly elevated levels of uranium, plutonium and americium isotopes. As a result, the spent GAC is classified as mixed waste. Because the GAC greatly exceeds LDR treatment standards for various VOCs (e.g., the PCE LDR level is 6 ppm, a sample of the waste was 7,400 ppm), the waste must be treated prior to disposal. The waste codes that apply to this waste are F001 and F002 (for the spent solvents TCE, PCE and 1,1,1-Trichloroethane from the Ryan's Pit Project) and D040 (TCE) and D009 (mercury) from the Trenches T-3 and T-4 Project. Listed and characteristic waste codes apply for TCE because the GAC contains TCE from both types of sources.

Other VOCs such as Benzene and Toluene were detected in the GAC. These constituents can be associated with RCRA listed hazardous waste codes (e.g., F005). However, these contaminants are suspected to have originated as components of gasoline, and not a solvent process. Therefore, the GAC does not carry listed codes for these types of constituents. Since mercury is a volatile metal, it was sorbed onto the GAC in the same manner as the VOCs during the TDU treatment.

Process knowledge and full suite TCLP results indicate that no other hazardous waste codes apply to this waste stream. A draft Land Disposal Notification and Certification Form is included with this submittal as Attachment 1. Because the GAC came from multiple sources, some of which were not listed or did not exceed a TCLP limit, not all waste codes associated with this profile are on all GAC waste containers. Attachment 2 contains a table which ties waste origination to waste codes, individual waste containers and corresponding sample numbers.

GENERAL CHARACTERIZATION APPROACH

Samples collected in support of this waste profile were collected to represent highest concentrations of contaminants from each of the two GAC sources (the TDU's and the CWTF). Waste removed from the TDUs carbon units were placed into ten, 55 gallon drums and four, 4' x 4' x 7' wooden waste crates. GAC contained in drum D87122 came from one of three parallel carbon units that was used in processing a greater volume of soil and debris than any other carbon unit. This drum was sampled three times to complete the waste profile (samples DB00012RM, DB00015RM, DB00038RM).

Samples of GAC from the CWTF originated from GAC that was removed from the top of the influent side of the GAC unit. This GAC would contain the highest levels of absorbed contaminants. Samples of the CWTF GAC are FT20601RG, FT20604RG, and DB00039RM. Attachment 3 contains a summary table of the GAC analytical results, the Form 1 Analytical Results and the log sheets and chain of custody forms used in the sample collection process.

Exceptions to the INEEL RRWAC

RRWAC, Section 4.6.2.1

Currently RF-W071 has not received treatment approval via the INEEL-Site Treatment Plan (STP) and is therefore not recognized by the Waste Analysis Plan.

RRWAC, Section 4.6.2.9

GAC is packaged as follows:

- thirty - 55 gallon drums with 2 plastic liners

- four - 4' x 4' x 7' wooden waste crates with 1 cardboard liner, and one plastic inner liner

L-0435 Waste Profile Information

L-0435.10: Generators Certification and Information

Item (6) Rate of Generation:

The rate of generation is listed as ongoing at a 775.5 ft³/yr. This section also lists the mass at 24156 lbs. The GAC generation rate of 775.5 ft³/yr represents the volume of GAC generated from a number of projects completed in approximately one year. It is anticipated that this waste stream will be generated from similar projects in the future at relatively like rates. Future projects will generate GAC with the same or similar waste codes, suites of contaminants, and at contaminant levels consistent with what is represented by this L-0435 form. As necessary, modifications to the L-0435's or other supporting documentation will be completed to represent future GAC waste streams. Attachment 4 gives the calculations and assumptions used at arriving the stated rate.

L-0435.11: Characterization of Material

Item (2)(d)(1) Heat of Combustion and item (2)(d)(2) Ash Content:

Ash content and BTU content are listed as:

Ash Content: 5-10%

Heat of Combustion: 5,000 - 10,000 BTU/lb

These estimates were given by Jim Sherbondy, Technical Representative for TIGG Corporation (412) 257-8520, an original supplier of the GAC in a telephone conversation with H. Salomon at Rocky Flats (303) 966-6627, on March 31, 1997

Item (2)(d)(3) Total Halogen Content:

Total halogen content is listed as <15 to 8,479 ppm.

The only halogens present in this GAC are expected to be from the chlorinated volatile organic compounds for which samples have been collected and analyzed. These samples evaluated total VOCs in the waste stream. Using these results and the molecular weights of the chlorinated compounds detected, the concentration of the chlorine (the only halogen expected) can be calculated. A copy of the spread sheet used to calculate the chlorine from the total VOC results is included as Attachment 5. These results represent the maximum expected chlorine (halogen) concentration from a biased grab sample (sample # DB00015RMDL).

L-0435.12: Radiological Characteristics of Material

Item (i) Other Isotopes Present:

Analytical results used for the quantitation of some isotopes in the GAC are reported as a combination of the isotopes (e.g., Uranium-233/234). Analytical results themselves do not allow for the identification of the specific isotope. In the case of Uranium-233/234 all results reported are attributable to the isotope Uranium-234, and are listed this way in section (i) of the L-0435.12 form. Operations requiring the generation, storage or use of Uranium-233 have not been performed at RFETS. Information regarding the use and storage of this isotope in the DOE system can be found in *Uranium-233 Storage Safety At Department of Energy Facilities*, Defense Nuclear Facilities Safety Board Technical Report, DNFSB/TECH-13, February, 1997.

Daughter Products were calculated using the computer software *Raddecay Programming and File Structure Information*, Grove Engineering, Inc., October, 1987. Only isotopes calculated to exceed the Section 4.6.2(7) RRWAC criteria of 0.1 pCi/g for alpha or beta emitters or 1 pCi/g for gamma emitters are listed on the form. The isotopes calculated to exceed this criteria are thorium-231 which is in equilibrium with uranium-235, thorium-234 and protactinium-234m which are both in equilibrium with uranium-238. A thirty three year age was assumed as the initial generation of the isotopes, which corresponds to the opening of the first burial trench of which the GAC is a treatment residue from.

Supporting Information Used to Complete the Waste Profile

<u>Attachment No.</u>	<u>Description</u>
1	LDR Notification and Certification Form - Including UTS
2	Table Tying Waste Origination to Waste Codes, Waste Containers and Corresponding Sample Numbers
3	Analytical Summary Tables, Analytical Data (Form 1's), Log Sheets, and Chain of Custody Forms
4	Assumptions Used for the Calculation of Volume, Mass and Rate of GAC Generation
5	Calculation of Maximum Chlorine (Halogen) Concentration
6	MSDSs for Granulated Activated Carbon and Radsorb
7	RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results



MATERIAL AND WASTE CHARACTERIZATION GENERATOR'S CERTIFICATION AND INFORMATION

FORM L-0435.10#
(07-96 - Rev. #00)

Receiving Organization Use Only:

Approved by: Signature: _____ Printed Name: _____
_____ RWMC _____ WROC _____ TAN _____ Pollution Prevention _____ ICPP
Characterization ID No.: _____ Content Code(s): _____ Date: _____

A. Generator's Certification

I certify that the information on this form L-0669# and attachments is true and accurate. I have put forth a good faith effort to acquire and verify the information used to complete this characterization. Willful and deliberate omissions have not been made. All known and suspected hazards have to the best of my knowledge been disclosed.

Generator Certifier Signature: F. J. Valenzuela Printed Name: F. J. Valenzuela Chief Waste Certification Official: _____ Date: July 15, 1997
Phone: (303) 966-2718 Mailstop: T883C Facsimile No.: (303) 966-7277 E-Mail ID: frank.valenzuela@rfets.gov
Generating Facility: Rocky Flats Environmental Technol Site Building: T-3/T-4, Ryans Pit, Building 891 Organization: Environmental Restoration Projects

B. General Information

1. ☒ Yes ☐ No Will material and waste characterization be fully capable of complying with applicable RRWAC Subsection?

If "No", receiving organization approval and completion of the following is required:

- a. INEL-RRWAC requirement(s) not met (list each): _____
b. Receiving organization approval letter number for nonstandard material or waste: _____

Contact	Name	E-Mail ID	Phone	Pager	Mail Stop	Charge Number
2. Generator	Mike Pepping		(303) 966-3075	966-4000 (7464)	T893B	NA
3. Technical	Hopi Salomon	hopi.salomon@rfets.gov	(303) 966-6627	966-4000 (5129)	T893B	NA

4. Material or Waste Type and action: 4.6.2 mixed LLW to be incinerated at the WERF

5. Common Name of Material: Spent Granulated Activated Carbon (GAC)

6. Rate of Generation: _____ One Time Only: Liquid _____ gal Solid _____ lb or _____ ft³ _____ m³
☒ On-going Liquid _____ gal/yr Solid 24156 lb or 775.5 ft³/yr _____ m³/yr

7. Generating Process Description: * This GAC was used to polish an airstream from a low-temperature thermal desorption unit used to treat VOC contaminated soil and debris, and from a CERCLA wastewater treatment unit (Building 891) where it was used as a final polishing step during processing of water from ER activities.

8. Physical State at 70°F (solid, liquid, sludge, gel, etc.): solid

9. _____ Yes ☒ No Does material contain free liquids?

10. _____ Yes _____ No Current Waste Minimization Plan (INEL Generators Only)

11. Indicate all that apply: ☒ CERCLA ☐ Scrap Metal ☒ OSHA Carcinogen ☐ PCB ≥ 50 ppm ☐ Etiologic Agent
☐ Nonfriable Asbestos ☐ FIFRA ☐ Unused Material ☐ Used Oil ☐ Aerosol Cans ☐ Compressed Gas Cylinders
☐ Friable Asbestos ☐ Soil ☐ Debris ☐ Spill Cleanup ☐ Wastewater ☐ Classified Material
☒ > 100 PPM VOCs ☐ Accountable Nuclear Material

12. ☒ Yes _____ No Is this DOT regulated hazardous material? If yes, identify DOT primary hazard: Class 9, Hazardous Waste Solid
and DOT subsidiary none

13. ☒ Yes _____ No At the point of generation did this material contain any RCRA "F", "K", "U", or "P" listed waste in pure form, as a mixture, or as a treatment residue (i.e., ash, leachate, spill cleanup), or "D" characteristic waste? If yes, give applicable EPA Hazardous Waste Numbers and attach applicable LDR notification and certification: (40 CFR 261): F001 F002 D040 D009

* Indicate when a continuation sheet is used.



MATERIAL AND WASTE CHARACTERIZATION GENERATOR'S CERTIFICATION AND INFORMATION

FORM L-0435.10#
(07-96 - Rev. #00)

14. RCRA hazardous waste determination was made by: ☒ Waste Analysis, and/or ☒ process knowledge. Include appropriate information as required by the GI.
15. For mixed waste, if Characterization ID No. is different than the INEL Site Treatment Plan Waste Stream (STP) ID No. the STP ID No. RF-W071-GAC
is:
16. ☒ Yes ☐ No Is Section C1, Physical Characteristics of Material, required by the GI? If yes, complete Section C1.
17. ☒ Yes ☐ No Is Section C2, Chemical Characteristics of Material required? If yes, complete Section C2.
18. ☒ Yes ☐ No Does the GI require radiological characterization? If yes, complete Section C3, Radiological Characteristics of Material, per GI instructions.
19. ☐ Yes ☒ No Is this a lab pack? If yes, complete Item D, Lab Pack Inventory List.
20. ☐ Yes ☒ No Does the GI require any additional information? If yes, see instructions.
21. ☒ Yes ☐ No Is determination of Underlying Hazardous Constituents required?
22. ☒ Yes ☐ No Is supporting documentation submitted? Is yes, list: 1) LDR Notification and Certification Form, 2) Table Tying Waste Origination to Waste Codes, Waste Containers, and Corresponding Sample Numbers, 3) Analytical Summary Tables, Analytical Data (Form I's), Log Sheets, and COC forms, 4) Assumptions Used for Calculation of Volume, Mass and Rate of GAC Generation, 5) Calculation of Maximum Chlorine (Halogen) Concentration, 6) MSDSs for GAC and RADSORB, 7) RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results (performed in accordance with 40 CFR Part 60, Appendix A, Method 21).



MATERIAL AND WASTE CHARACTERIZATION CHARACTERIZATION OF MATERIAL

FORM L-0435.11#
(07-96 - Rev. #00)

Characterization Identification No.: _____

C. Characterization of Material

1. Physical Characteristics of Material:

a. General characteristics: (number from top to bottom. For nonlayered No. 1 is 100%)

Layer No.	Physical state at 70°F	Range of Percentage of Total		Color (as required by GI)
1.	<u>solid</u>	<u>98</u>	to <u>100</u>	<u>black granular material (GAC)</u>
2.	<u>solid</u>	<u>0</u>	to <u>2</u>	<u>white, fine granular material (RADSORB - absorbent)</u>
3.	_____	_____	to _____	_____
4.	_____	_____	to _____	_____
5.	_____	_____	to _____	_____

b. ☒ Yes ☐ No Is density required? If yes, give density range of representative sample.
Liquid: _____ to _____ g/mL. Solid: 0.25 to 0.6 g/cc.

c. ☐ Yes ☒ No Is this aqueous waste to be processed in the PWTU? If yes, give total solids range for representative sample: _____ to _____ g/mL.

d. ☐ Yes ☒ No Is this WERF incinerable liquid? If yes, give viscosity: _____ to _____ SSU.

2. Chemical Characteristics of Material:

a. Does the material contain any of the following? For each item (1)-(14) checked yes, must include corresponding quantitative information in C2b, with the corresponding number (1)-(14) from this list.

YES	NO		YES	NO	
_____	<input checked="" type="checkbox"/>	(1) Organic free liquid	_____	_____	For liquid waste only:
_____	<input checked="" type="checkbox"/>	Aqueous free liquid	_____	_____	Nickel and/or its compounds (as Ni) \geq 134 mg/L
_____	_____	If yes, give pH range _____ to _____	_____	_____	Thallium and/or its compounds (as Tl) \geq 103 mg/L
<input checked="" type="checkbox"/>	_____	(2) Absorbents	_____	_____	Halogenated organic compounds \geq 1000 mg/L
_____	<input checked="" type="checkbox"/>	(3) Chelating agents	_____	_____	as listed in 40 CFR 268, Appendix III
_____	<input checked="" type="checkbox"/>	(4) Aqueous liquid with reactive cyanide \geq 250 ppm	_____	_____	For solid waste only:
_____	<input checked="" type="checkbox"/>	(5) Aqueous liquid with reactive sulfide \geq 500 ppm	<input checked="" type="checkbox"/>	_____	Halogenated organic compounds \geq 1000 mg/kg as
_____	<input checked="" type="checkbox"/>	(6) Air reactive	_____	_____	listed in 40 CFR 268, Appendix III
_____	<input checked="" type="checkbox"/>	(7) Water reactive	_____	_____	For used oil only:
_____	<input checked="" type="checkbox"/>	(8) Other reactive	_____	_____	Arsenic \geq 5 ppm
_____	<input checked="" type="checkbox"/>	(9) Fuming acids or acid gases	_____	_____	Cadmium \geq 2 ppm
_____	<input checked="" type="checkbox"/>	(10) Shock sensitive constituents	_____	_____	Chromium \geq 10 ppm
_____	<input checked="" type="checkbox"/>	(11) Explosives	_____	_____	Lead \geq 100 ppm
_____	<input checked="" type="checkbox"/>	(12) Pyrophorics	_____	_____	PCBs \geq 2 ppm
_____	<input checked="" type="checkbox"/>	(13) Petroleum products	_____	_____	Total halogens \geq 4,000 ppm
_____	<input checked="" type="checkbox"/>	(14) Oxidizers	_____	_____	Total halogens \geq 1,000 ppm
<input checked="" type="checkbox"/>	_____	Benzene	_____	_____	For fluid to be processed in the PWTU only:
_____	<input checked="" type="checkbox"/>	PCBs \geq 25 ppm	_____	_____	Oil and grease \geq 10 mg/L
_____	<input checked="" type="checkbox"/>	PCBs \geq 5 ppm	_____	_____	



MATERIAL AND WASTE CHARACTERIZATION CHARACTERIZATION OF MATERIAL

FORM L-0435.11#
(07-96 - Rev. #00)

Characterization Identification No.: _____

C. Characterization of Material

2. Continued

2a. Continued

YES NO

YES NO

For WERF incinerable wastes only:

<u> </u>	<u> x </u>	PCB liquids	<u> x </u>	<u> </u>	Chlorine in any form
<u> </u>	<u> x </u>	PCB capacitors/ballasts	<u> </u>	<u> x </u>	Bromine in any form
<u> </u>	<u> x </u>	PCB transformers/regulators.	<u> </u>	<u> x </u>	Iodine in any form
		If yes, check the following as applicable.	<u> </u>	<u> x </u>	Flourine in any form
		<u> </u> Full <u> </u> Drained Only <u> </u> Drained and flushed	<u> x </u>	<u> </u>	Sulfur in any form
<u> </u>	<u> x </u>	Is the material PCB-liquid-contaminated debris or derived from a spill of PCB liquid? If yes, give range or original PCB concentration. _____ to _____ ppm.	<u> </u>	<u> x </u>	PCBs \geq 2 ppm

b. Chemical Characteristics of Material: For all the items checked in 2a, enter the common name as indicated and quantitative data as required. Also enter the number, i.e., (1-14) as checked in 2a., when appropriate.

Composition: (as required by GI)

Name of Material or Chemical	2a Item No.	OSHA Carcinogen?		FIFRA Regulated?		Composition Range _____ weight % or <u> x </u> ppm	
<u>Absorbent (RADSORB)</u>	<u> (2) </u>	<u> </u> Yes	<u> x </u> No	<u> </u> Yes	<u> x </u> No	<u> 2,000 </u> to <u> 20,000 </u>	
<u>Benzene</u>	<u> </u>	<u> x </u> Yes	<u> </u> No	<u> </u> Yes	<u> x </u> No	<u> <0.6 </u> to <u> 270 </u>	
<u>Halogenated organic compounds >1000 mg/kg</u>	<u> </u>	<u> </u> Yes	<u> </u> No	<u> </u> Yes	<u> </u> No	<u> </u> to <u> </u>	
<u>Tetrachloroethene (perchloroethene, PCE)</u>	<u> </u>	<u> </u> Yes	<u> x </u> No	<u> </u> Yes	<u> x </u> No	<u> 12 </u> to <u> 7,400 </u>	
<u>Trichloroethene (TCE)</u>	<u> </u>	<u> </u> Yes	<u> x </u> No	<u> </u> Yes	<u> x </u> No	<u> 0.83 </u> to <u> 2,300 </u>	
<u>Sulfur in any form (total sulfur)</u>	<u> </u>	<u> </u> Yes	<u> x </u> No	<u> </u> Yes	<u> x </u> No	<u> 0.945 </u> to <u> 7.7 </u>	

Continuation sheet included? Yes x No

c. Yes x No Is flash point required? If yes, complete the following:

Flash point is _____ to _____ °F (400 to 400 °C) Method used: Open Cup Closed Cup x Other
(specify): flash point data gathered from MSDS - ASTM method (for dry, virgin state - however, not tested on this spent GAC)

d. Information for WERF incinerable waste only:

(1) Heat of combustion 5,000 to 10,000 Btu/lb (2) Ash content 5 to 10 %
(3) Total halogen content <15 to 8,479 ppm (4) Water content _____ to _____ %
(5) Suspended particulate content _____ to _____ ppm

e. x Yes No Is RCRA Waste analysis required? If yes, enter data below, as applicable.

 x Yes No Were the sampling and analysis protocols used in full compliance with SW-846 protocol or other equivalent regulatory agency approved methods? If no, explain in Section B Items 20 and 22.



MATERIAL AND WASTE CHARACTERIZATION CHARACTERIZATION OF MATERIAL

FORM L-0435.11#
(07-96 - Rev. #00)

Characterization Identification No.: _____

C. Characterization of Material						
2. f. Analyte Data:						
Analyte	Underlying Hazardous Constituent? (Y/N)	Type of Analysis Indicate		Expected Concentration Range ____mg/kg or ____mg/L	Representative Sample Analysis ____mg/kg or ____mg/L	Detection Limit ____mg/kg or ____mg/L
		Total	or TCLP			
1. tetrachlorethene	y	x		to	7,400	
2. trichloroethene	y	x		to	2,300	
3. 1,2 Dichloropropane	y	x		to	280	
4. benzene	y	x		to	270	
5. toluene	y	x		to	190	
6. carbon tetrachloride	y	x		to	170	
7. 1,1,1-trichloroethane	y	x		to	120	
8. chloroform	y	x		to	78	
9. xylene (total)	y	x		to	70	
10. ethylbenzene	y	x		to	56 (J)	
11. 4-methyl-2-pentanone	y	x		to	38 (J)	
12. MEK (2-Butanone)	y	x		to	0.54 - 110 (J)	
13. styrene	n	x		to	16 (J)	
14. pyridine	y		x	to	0.7 (E) mg/L	
15. mercury	y		x	to	0.0033-0.617 mg/L	
16. mercury	y	x		to	2.5-41.3	
17. copper	n	x		to	19.4 - 51,348.4	
18.				to		
19.				to		
20.				to		
21.				to		
22.				to		
23.				to		
24.				to		
25.				to		
26.				to		
27.				to		
28.				to		
29.				to		
30.				to		
31.				to		
32.				to		
33.				to		
34.				to		
35.				to		
36.				to		
37.				to		



MATERIAL AND WASTE CHARACTERIZATION RADIOLOGICAL CHARACTERISTICS OF MATERIAL

FORM L-0435.12#
(07-96 - Rev. #00)

Characterization Identification No.: _____

C. Characterization of Material

3. Radiological Characteristics of Material:

- a. For MLLW and MTRU give (check one) ☐ Known or ☒ Estimated date of initial generation: at or before October 1964
- b. ☐ Yes ☒ No Is waste treatment plan for MLLW on file with INEL MLLW coordinator?
- c. ☒ Yes ☐ No Is fissile material present? If yes, waste matrix group _____ (RWMC Acceptance Only)
- d. ☒ Yes ☐ No Are transuranic isotopes present? If yes, complete items 3e, 3f, and 3h.
- e. Total activity per gram of waste of alpha emitting transuranic isotopes with half-lives greater than 20 years:
☒ Yes ☐ No ≤ 10 nCi/g (LLW) or
☐ Yes ☒ No > 10 nCi/g and ≤ 100 nCi/g, (SCW), or
☐ Yes ☒ No > 100 nCi/g (TRU)

f. Transuranic isotope inventory:

Isotope	Activity Range		Fissionable Material Range		Representative Sample Analysis	
	Units	(pCi/g)	g / kg		Activity (nCi/g)	Fissionable Material g / kg
<u>Pu-239/240</u>	<u>0.013+/- 0.005</u>	to <u>0.376+/- 0.034</u>	<u>1.29E-10</u>	to <u>6.59E-09</u>	_____	_____
<u>Am-241</u>	<u>0.004+/- 0.004</u>	to <u>0.382+/- 0.050</u>	<u>0</u>	to <u>1.26E-10</u>	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
Summation:	<u>0.017</u>	to <u>0.758</u>	<u>1.29E-10</u>	to <u>6.72E-09</u>	_____	_____

- g. ☒ Yes ☐ No Is U-233 or U-235 present? If yes, complete data below and item 3h.

Isotope	Activity Range		Fissionable Material Range		Representative Sample Analysis	
	Units	(pCi/g)	g / kg		Activity (Ci/g)	Fissionable Material g / kg
U-233	_____	to _____	_____	to _____	_____	_____
	enriched to _____	%				
U-235	<u>0.013+/- 0.013</u>	to <u>0.240+/- 0.032</u>	<u>0</u>	to <u>1.26E-04</u>	_____	_____
	enriched to <u>0</u>	%				

- h. Fissionable material range summation: 1.29E-10 to 1.26E-04 (grams)

Attachment 1

LDR Notification and Certification Form - Including UTS

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM (UTS)

Generator Name: U.S. Dept. of Energy/ Rocky Flats ETS

Manifest Doc. No.:

CWM Profile Number: RFW071 (Spent Granulated Activated Carbon)

State Manifest No.: N.A.

1. Is this waste a non-wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: Non-Wastewater ☒ Wastewater ☐
 2. If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable:
 _____ HOCs, _____ PCBs, _____ Metals, _____ Acid, _____ Cyanides. (Removed from regulation per 62FR 26005)
 3. Identify ALL US EPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subcategory, or check NONE if the waste code has no subcategory. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those constituents must be listed and attached by the generator. If D001, D002, or D012-D043 requires treatment of the characteristic and meet 268.48 standards, then the underlying hazardous constituent(s) present in the waste must be listed and attached.

R E F #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. HOW MUST THE WASTE BE MANAGED? ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	
1	F001		X	A
2	F002		X	A
3	D040		X	A
4	D009	(Low Mercury Subcategory)		A
5				
6				
7				
8				
9				
10				

To identify F039 or D001, D002, D012-D043, underlying hazardous constituent(s), use the "F039/Underlying Hazardous Constituent Form" provided (CWM-2004) and check here: ☒
 If no UHCs are present in the waste upon its initial generation check here: ☐
 To list additional US EPA waste code(s) and subcategory(ies), use the supplemental sheet provided (CWM-2005-B) and check here: ☐

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).
☐ For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B. 1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268, Subpart D, and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B. 2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B. 3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264, Subpart O, or 40 CFR Part 265, Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
☐ For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS

This waste is a newly identified waste that is not currently subject to any 40 CFR 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature: [Signature]

CWM-2005A (12/94)

Title: PROJECT MANAGER
Project Manager

Date: 6-24-97

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM - REVERSE SIDE

SOLVENT AND CALIFORNIA LIST TREATMENT STANDARDS

If the waste identified on the other side of this form is described by any of the following US EPA hazardous waste codes: F001, F002, F003, F004, F005, and all solvent constituents will not be monitored by the treater, and/or this hazardous waste is subject to any prohibitions identified as California List restrictions (40 CFR 268.32 and/or RCRA Section 3004(d)), then each constituent MUST be identified below by checking the appropriate box, and this page must accompany the shipment, along with the opposite side of this form. If the waste code F039 describes this waste, then the corresponding list of constituents must be attached. If D001, D002, or D012-D043 require treatment to 268.48 standards, then the underlying hazardous constituent(s) must also be attached.

SOLVENT WASTE TREATMENT STANDARDS							
✓	F001 through F005 spent solvent constituents and their associated US EPA hazardous waste code(s).	Treatment Standard ¹		✓	F001 through F005 spent solvent constituents and their associated US EPA hazardous waste code(s).	Treatment Standard ¹	
		Wastewaters	Nonwastewaters			Wastewaters	Nonwastewaters
	Acetone (F003)	0.28	160		Methylene chloride (F001, F002)	0.089	30
	Benzene (F005)	0.14	10		Methyl ethyl ketone (F005)	0.28	36
	n-Butyl alcohol (F003)	5.6	2.6		Methyl isobutyl ketone (F003)	0.14	33
	Carbon disulfide (F005)	3.8	4.8 TCLP		Nitrobenzene (F004)	0.068	14
	Carbon tetrachloride (F001)	0.057	6.0		2-Nitropropane (F005)	[[WETOX or CHOXD] followed by CARBN] OR INCIN	INCIN
	Chlorobenzene (F002)	0.057	6.0				
	O-Cresol (F004)	0.11	5.6		Pyridine (F005)	0.014	16
	Cresols (m- and p-isomers) (F004)	0.77	5.6	X	Tetrachloroethylene (F001, F002)	0.056	6.0
	Cyclohexanone (F003)	0.36	0.75 TCLP		Toluene (F005)	0.08	10
	o-Dichlorobenzene (F002)	0.088	6.0	X	1,1,1-Trichloroethane (F001, F002)	0.054	6.0
	2-Ethoxyethanol (F005) (also called ethylene glycol monethyl ether)	INCIN or BIODG	INCIN		1,1,2-Trichloroethane (F002)	0.054	6.0
					1,1,2-Trichloro-1,2,2-trifluoroethane (F002)	0.057	30
	Ethyl acetate (F003)	0.34	33				
	Ethyl benzene (F003)	0.057	10	X	Trichloroethylene (F001, F002)	0.054	6.0
	Ethyl ether (F003)	0.12	160		Trichloromonofluoromethane (F002)	0.02	30
	Isobutanol (F005)	5.6	170		Xylenes (F003) (sum of o-, p-, and m-isomers)	0.32	30
	Methanol (F003)	5.6	0.75 TCLP				

1. All spent solvent treatment standards are measured through a total waste analysis (TCA), unless otherwise noted. Wastewater units are mg/l, nonwastewater are mg/kg.

CALIFORNIA LIST TREATMENT STANDARDS – 40 CFR 268.32, 40 CFR 268.42 and RCRA Section 3004(d)		
A waste must first be designated as a US EPA Hazardous waste before the waste can be subject to the California List restrictions.		
Restricted waste description	Prohibition	Treatment Standard
Liquid* or nonliquid wastes containing Halogenated Organic Compounds listed in 40 CFR 268, Appendix III	Liquid* wastes: Greater than or equal to 1,000 mg/l Nonliquid wastes: Greater than or equal to 1,000 mg/kg	40 CFR 268.42(a)(2) – INCIN or FSUBS
Liquid* wastes containing PolyChlorinated Biphenyls (PCBs)	Greater than or equal to 50 ppm	40 CFR 268.42(a)(1) – INCIN or FSUBS Also see 40 CFR 761.60 and .70
Liquid* wastes containing Metals Note: Hazardous wastes containing As, Cd, Cr, Hg, Pb, or Se must also be evaluated if not characteristically hazardous for that metal.	One or more of the following metals (or elements) at a concentration greater than or equal to the following: Nickel and/or compounds as Ni: 134 mg/l Thallium and/or compounds as Th: 130 mg/l	RCRA Section 3004(d)

CWM-2005A (12/94)

* - For the definition of "liquid" refer to Method 9095, the Paint Filter Liquids Test from EPA manual SW-846

SUBCATEGORY REFERENCE

- D001:**
A. Ignitable characteristic wastes, except for the 40 CFR 261.21(a)(1) High TOC subcategory, that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems.
B. Ignitable characteristic wastes, except for the 40 CFR 261.21(a)(1) High TOC subcategory, that are managed in CWA, CWA-equivalent, or Class I SDWA systems.
C. High TOC ignitable characteristic liquids subcategory based on 40 CFR 261.21(a)(1) - Greater than or equal to 10% total organic carbon.
D002:
D. Corrosive characteristic wastes that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems.
E. Corrosive characteristic wastes that are managed in CWA, CWA-equivalent, or Class I SDWA systems.

UNDERLYING HAZARDOUS CONSTITUENT FORM (UTS)

Generator Name: U.S. Dept. of Energy/Rocky Flats ETS Manifest Doc. No.:

Waste ID No.: RF-W071 (Spent Granulated Activated Carbon) State Manifest No.: N.A.

If D001, D002, D003, or D012-D043 requires treatment to 268.48 standards, then each underlying hazardous constituent present in the waste at the point of generation, and at a level above the UTS constituent specific treatment standard, must be listed. Write the letter (A, B1, B3, or C which corresponds to the letter on the Land Disposal Notification and Certification Form (UTS)) beside each constituent present to properly describe how the constituent(s) must be managed under 40 CFR 268.7.

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
ORGANIC				Carbomulfan		0.028	1.4
A2213		0.003	1.4	Chlordane (alpha and gamma isomers)		0.0033	0.26
Acenaphthene		0.059	3.4	p-Chloroaniline		0.46	16
Acenaphthylene		0.059	3.4	Chlorobenzene		0.057	6.0
Acetone		0.28	160	Chlorobenzilate		0.10	NA
Acetonitrile		5.6	38	2-Chloro-1,3-butadiene		0.057	0.28
Acetophenone		0.010	9.7	Chlorodibromomethane		0.057	15
2-Acetylaminofluorene		0.059	140	Chloroethane		0.27	6.0
Acrolein		0.29	NA	bis(2-Chloroethoxy)methane		0.036	7.2
Acrylamide		19	23	bis(2-Chloroethyl)ether		0.033	6.0
Acrylonitrile		0.24	84	2-Chloroethyl vinyl ether		0.062	NA
Aldicarb sulfone		0.056	0.28	Chloroform	A	0.046	6.0
Aldrin		0.021	0.066	bis(2-Chloroisopropyl)ether		0.055	7.2
4-Aminobiphenyl		0.13	NA	p-Chloro-m-cresol		0.018	14
Aniline		0.81	14	Chloromethane/Methyl chloride		0.19	30
Anthracene		0.059	3.4	2-Chloronaphthalene		0.055	5.6
Aramidite		0.36	NA	2-Chlorophenol		0.044	5.7
Bahtan		0.056	1.4	3-Chloropropylene		0.036	30
Bendiocarb		0.056	1.4	Chrysene		0.059	3.4
Bendiocarb phenol		0.056	1.4	o-Cresol		0.11	5.6
Benzonitrile		0.056	1.4	m-Cresol (difficult to distinguish from p-Cresol)		0.77	5.6
Benz(a)anthracene		0.059	3.4	p-Cresol (difficult to distinguish from m-Cresol)		0.77	5.6
Benzal Chloride		0.053	6.0	m-Cumenyl methylcarbamate		0.056	1.4
Benzene	A	0.14	10	Cycloate		0.003	1.4
Benzo(b)fluoranthene (difficult to distinguish from benzo(k)fluoranthene)		0.11	6.8	Cyclohexanone		0.36	0.75 mg/l TCLP
Benzo(k)fluoranthene (difficult to distinguish from benzo(b)fluoranthene)		0.11	6.8	o,p'-DDD		0.023	0.087
Benzo(g,h,i)perylene		0.0055	1.8	p,p'-DDD		0.023	0.087
Benzo(a)pyrene		0.061	3.4	o,p'-DDE		0.031	0.087
alpha-BHC		0.00014	0.066	p,p'-DDE		0.031	0.087
beta-BHC		0.00014	0.066	o,p'-DDT		0.0039	0.087
delta-BHC		0.023	0.066	p,p'-DDT		0.0039	0.087
gamma-BHC		0.0017	0.066	Dibenz(a,h)anthracene		0.055	8.2
Bromodichloromethane		0.35	15	Dibenz(a,s)pyrene		0.061	NA
Bromomethane/Methyl bromide		0.11	15	1,2-Dibromo-3-chloropropane		0.11	15
4-Bromophenyl phenyl ether		0.053	15	1,2-Dibromoethane/Ethylene dibromide		0.028	15
n-Butyl alcohol		5.6	2.6	Dibromomethane		0.11	15
Butyl benzyl phthalate		0.017	28	m-Dichlorobenzene		0.036	6.0
Butylate		0.003	1.4	o-Dichlorobenzene		0.088	6.0
2-sec-Butyl-4,6-dinitrophenol/Dinoseb		0.066	2.5	p-Dichlorobenzene		0.090	6.0
Carbaryl		0.006	0.14	Dichlorodifluoromethane		0.23	7.2
Carbenzadim		0.056	1.4	1,1-Dichloroethane		0.059	6.0
Carbofuran		0.006	0.14	1,2-Dichloroethane		0.21	6.0
Carbofuran phenol		0.056	1.4	1,1-Dichloroethylene		0.025	6.0
Carbon disulfide		3.8	4.8 mg/l TCLP	trans-1,2-Dichloroethylene		0.054	30
Carbon tetrachloride	A	0.057	6.0	2,4-Dichlorophenol		0.044	14

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/kg)
2,6-Dichlorophenol		0.044	14	HxCDFs (All Hexachlorodibenzofurans)		0.000063	0.001
2,4-Dichlorophenoxyacetic acid/2,4-D		0.72	10	Indeno (1,2,3-a,d) pyrenes		0.0055	3.4
1,2-Dichloropropane	A	0.85	18	Iodomethane		0.19	65
cis-1,3-Dichloropropylene		0.036	18	3-Iodo-2-propynyl n-butylcarbamate		0.056	1.4
trans-1,3-Dichloropropylene		0.036	18	Isobutyl alcohol		5.6	170
Dieldrin		0.017	0.13	Isodrin		0.021	0.066
Diethyl phthalate		0.20	28	Isolan		0.056	1.4
Dichloro glycol, dicarbamate		0.056	1.4	Isosfrole		0.081	2.6
p-Dimethylaminodibenzene		0.13	NA	Kepon		0.0011	0.13
2,4-Dimethyl phenol		0.036	14	Methacrylonitrile		0.24	84
Dimethyl phthalate		0.047	28	Methanol		5.6	0.75 mg/l TCLP
Dimethlan		0.056	1.4	Methapyrilene		0.081	1.5
Di-n-butyl phthalate		0.037	28	Methiocarb		0.056	1.4
1,4-Dinitrobenzene		0.32	2.3	Methomyl		0.028	0.14
4,6-Dinitro-o-cresol		0.28	160	Methoxychlor		0.25	0.18
2,4-Dinitrophenol		0.12	160	Methyl ethyl ketone	A	0.28	36
2,4-Dinitrotoluene		0.32	140	Methyl isobutyl ketone	A	0.14	33
2,6-Dinitrotoluene		0.55	28	Methyl methacrylate		0.14	160
Di-n-octyl phthalate		0.017	28	Methyl methanesulfonate		0.018	NA
Di-n-propylnitrosamine		0.40	14	Methyl parathion		0.014	4.6
1,4-Dioxane		12.0	170	3-Methylcholanthrene		0.0055	15
Diphenylamine (difficult to distinguish from diphenylhydrazine)		0.92	13	4,4-Methylene bis(2-chloroaniline)		0.50	30
Diphenylnitrosamine (difficult to distinguish from diphenylamine)		0.92	13	Methylene chloride		0.089	30
1,2-Diphenylhydrazine		0.087	NA	Metolcarb		0.056	1.4
Disulfoton		0.017	6.2	Mexacarbale		0.056	1.4
Dithiocarbamates (total)		0.028	28	Molinate		0.003	1.4
Endosulfan I		0.023	0.066	Naphthalene		0.059	5.6
Endosulfan II		0.29	0.13	2-Naphthylamine		0.52	NA
Endosulfan sulfate		0.029	0.13	o-Nitroaniline		0.27	14
Endrin		0.0028	0.13	p-Nitroaniline		0.028	28
Endrin aldehyde		0.025	0.13	Nitrobenzene		0.068	14
EPTC		0.003	1.4	5-Nitro-o-toluidine		0.32	23
Ethyl acetate		0.34	33	o-Nitrophenol		0.028	13
Ethyl benzene	A	0.057	10	p-Nitrophenol		0.12	29
Ethyl cyanide/Propanenitrile		0.24	360	N-Nitrosodiethylamine		0.40	28
Ethyl ether		0.12	160	N-Nitrosodimethylamine		0.40	2.3
Ethyl methacrylate		0.14	160	N-Nitroso-di-n-butylamine		0.40	17
Ethylene oxide		0.12	NA	N-Nitrosomethylethylamine		0.40	2.3
bis(2-Ethylhexyl) phthalate		0.28	28	N-Nitrosomorpholine		0.40	2.3
Famphur		0.017	15	N-Nitrosopiperidine		0.013	35
Fluoranthene		0.068	3.4	N-Nitrosopyrrolidine		0.013	35
Fluorene		0.059	3.4	Oxamyl		0.056	0.28
Formetanate hydrochloride		0.056	1.4	Parathion		0.014	4.6
Formparanate		0.056	1.4	Total PCBs (sum of all PCB isomers, or all Aroclors)		0.10	10
Heptachlor		0.0012	0.066	Pebrilate		0.003	1.4
Heptachlor epoxide		0.016	0.066	Pentachlorobenzene		0.055	10
Hexachlorobenzene		0.055	10	PcCDDs (All Pentachlorodibenzo-p-dioxins)		0.000063	0.001
Hexachlorobutadiene		0.055	5.6	PcCDFs (All Pentachlorodibenzofurans)		0.000035	0.001
Hexachlorocyclopentadiene		0.057	2.4	Pentachloroethane		0.055	6.0
Hexachloroethane		0.055	30	Pentachloronitrobenzene		0.055	4.8
Hexachloropropylene		0.035	30	Pentachlorophenol		0.089	7.4
HxCDDs (All Hexachlorodibenzo-p-dioxins)		0.000063	0.001	Phenacetin		0.081	16

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
Phenanthrene		0.059	5.6	1,1,1-Trichloroethane	A	0.054	6.0
Phenol		0.039	6.2	1,1,2-Trichloroethane		0.054	6.0
o-Phenylenediamine		0.056	5.6	Trichloroethylene	A	0.054	6.0
Phorate		0.021	4.6	Trichloromono-fluoromethane		0.020	30
Phthalic acid		0.055	28	2,4,5-Trichlorophenol		0.18	7.4
Phthalic anhydride		0.055	28	2,4,6-Trichlorophenol		0.035	7.4
Physostigmine		0.056	1.4	2,4,5-Trichlorophenoxyacetic acid/2,4,5-T		0.72	7.9
Physostigmine salicylate		0.056	1.4	1,2,3-Trichloropropane		0.85	30
Promecarb		0.056	1.4	1,1,2-Trichloro-2,2,2-trifluoroethane		0.057	30
Pronamide		0.093	1.5	Triethylamine		0.081	1.5
Propam		0.056	1.4	tris-(2,3-Dibromopropyl) phosphate		0.11	0.10
Propoxur		0.056	1.4	Vernolate		0.003	1.4
Prothiopharb		0.003	1.4	Vinyl chloride		0.27	6.0
Pyrene		0.067	8.2	Xylenes-mixed isomers (sum of o-, m-, and p-xylenes concentrations)	A	0.32	30
Pyridine	A	0.014	16	INORGANIC			
SaRoLe		0.081	22	Antimony		1.9	2.1 mg/l TCLP
Silvex /2,4,5-TP		0.72	7.9	Arsenic		1.4	5.0 mg/l TCLP
1,2,4,5-Tetrachlorobenzene		0.055	14	Barium		1.2	7.6 mg/l TCLP
TCDDs (All Tetrachlorodibenzo-p-dioxins)		0.000063	0.001	Beryllium		0.82	0.014 mg/l TCLP
TCDFs (All Tetrachlorodibenzofurans)		0.000063	0.001	Cadmium		0.69	0.19 mg/l TCLP
1,1,1,2-Tetrachloroethane		0.057	6.0	Chromium (Total)		2.77	0.86 mg/l TCLP
1,1,1,2-Tetrachloroethenes		0.057	6.0	Cyanides (Total)		1.2	\$90
Tetrachloroethylene	A	0.056	6.0	Cyanides (Amenable)		0.86	30
2,3,4,6-Tetrachlorophenol		0.030	7.4	Lead		0.69	0.37 mg/l TCLP
Thiodicarb		0.019	1.4	Mercury-Nonwastewater from Retort		NA	0.20 mg/l TCLP
Thiophanate-methyl		0.056	1.4	Mercury-All Others	A	0.15	0.025 mg/l TCLP
Tirpate		0.056	0.28	Nickel		3.98	5.0 mg/l TCLP
Toluene	A	0.080	10	Selenium		0.82	0.16 mg/l TCLP
Toxaphene		0.0095	2.6	Silver		0.43	0.30 mg/l TCLP
Triallate		0.003	1.4	Sulfide		14	NA
Tribromomethane/Bromoform		0.63	15	Thallium		1.4	0.78 mg/l TCLP
1,2,4-Trichlorobenzene		0.055	19				

Notes to table:

¹Concentration standards for wastewaters are expressed in mg/l are based on analysis of composite samples.

²Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards expressed as a concentration were established, in part, based upon incineration in units operated in accordance with the technical requirements of 40 CFR part 264, subpart O or 40 CFR part 265, subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268.40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

³Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of one hour and 15 minutes.

Attachment 2

Table Tying Waste Origination to Waste Codes, Waste Containers and Corresponding Sample Numbers

Table A2-1 Tie Between Waste Origination, Waste Codes, Individual Waste Containers and Corresponding Sample Numbers for Granulated Activated Carbon (GAC) Proposed for Incineration at INEEL WERF June 25, 1997 (4:02PM)

Debris Type	Regulatory Classification	Packaging	NRWOL/ Container numbers	Interim Storage	Expected Disposition	Sampling: Analysis/Media	Approx Volume (yd ³)
radioactive GAC - T-3/T-4	Mixed Waste D009, D040	4 waste crates and 10, 55-gal drums	12524-8/ P02172,P02173,P02174, P02175, D87113, D87117, D87118, D87119, D87121, D87122, D87126, D87128, D87130, D87132	Unit 13, and 15a	incineration at INEL's WERF, ash disposal at Envirocare	DB00012RM: TCLP (full suite), reactive sulfide, reactive cyanide, DB00015RM: VOA screen, DB00038RM: Isotopic alpha, sulfur, total metals	15
radioactive GAC - Ryan's Pit & T-3/T-4	Mixed Waste F001/F002 (derived from rule) D009, D040	3 waste crates	NRWOL: T0083928/ P02176, P02243, P02245	Unit 13	incineration at INEL's WERF, ash disposal at Envirocare	Same as above	7
radioactive GAC - Building 891 (CWTF)	Mixed Waste F001/F002 (derived from rule)	20, 55-gal drums	T0089808-1/ D87311, D87384, D87308, D87307, D87306, D87305, D87127, D87385, D87304, D87382, D87388, D87387, D87389, D87310, D87386, D87383, D87302, D87303, D87309, D87712	Unit 1804	incineration at INEL's WERF, ash disposal at Envirocare	Sample FT20601RG: total VOAs, total metals, isotopic alpha Sample FT20604RG: TCLP VOAs, TCLP metals, reactive sulfide, reactive cyanide, pH, DB00039RM: sulfur	5

Attachment 3

**Analytical Summary Tables, Analytical Data (Form 1's),
Log Sheets, and Chain of Custody Forms**

Table A3-1 Summary Results of GAC Samples

June 25, 1997 (2:50PM)

Sample Number	Sample Date	Analyses	Media	Results	Comments
DB00012RM DB00013RM	8/26/96	Full suite TCLP (+Cu, Zn), +reactive sulfide and cyanide	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	0.45 mg/l PCE 0.55 mg/l TCE - Hazardous 2.0 mg/l 2-Butanone (methyl- ethyl-ketone) 0.14 mg/l Benzene 0.052 mg/l Carbon tetrachloride 0.12 mg/l Chloroform 0.7 mg/l Pyridine (E) (probable UTS) 0.304 mg/l Barium 0.617 mg/l mercury-Hazardous 0.239 mg/l Zinc 0.2 mg/kg - Reactive Cyanide	Hazardous for TCE and mercury DB00013RM is the QC trip blank
DB00015RM	9/10/96	VOA Screen	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	<p>8,200 ppm PCE (E) 2,300 ppm TCE 280 ppm 1,2-Dichloropropane 270 ppm Benzene 190 ppm Toluene 170 ppm Carbon tetrachloride 120 ppm 1,1,1-Trichloroethane 78 ppm Chloroform 70 ppm Xylene (total) 43 ppm ethylbenzene (J) 38 ppm 4-Methyl-2-Pentanone 16 ppm styrene (J)</p> <p>Sample was re-run because of the "E" flag on PCE (sample DB00015RM-DL) 7,400 ppm PCE 2,100 ppm TCE 240 ppm 1,2-Dichloropropane(J) 250 ppm Benzene 180 ppm Toluene(J) 160 ppm Carbon tetrachloride(J) 120 ppm 1,1,1-Trichloroethane(J) 76 ppm Chloroform(J) 52 ppm Xylene (total) 56 ppm ethylbenzene (J)</p>	Process knowledge indicates that would be the highest VOA concentration GAC
DB00038RM	5/28/97	Total sulfur Total Metals Isotopics	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	<p>0.945 mg/kg sulfur</p> <p>41.3 mg/kg mercury</p> <p>isotopics 0.20+/-0.066 pCi/g U-238 (MDA 0.041) 0.013+/-0.013 pCi/g U-235 (MDA 0.050) 0.037+/-0.032 pCi/g U-233/234 (MDA 0.041) 0.002+/-0.003 pCi/g Pu-238 (MDA 0.006) 0.013+/-0.005 pCi/g Pu-239/240 (MDA 0.005) 0.004+/-0.004 pCi/g Am-241 (MDA 0.004) -0.004+/-0.007 pCi/g Th-232 (MDA 0.027) 0.025+/-0.028 pCi/g Th-228 (MDA 0.051)</p>	-

Sample Number	Sample Date	Analyses	Media	Results	Comments
FT20601RG	12/05/96	Total VOAs, total metals, isotopics	GAC from CWTF	VOAS 12 ppm PCE 0.830 ppm TCE 0.39 ppm Toluene(J) 0.33 ppm 1,1,1-Trichloroethane(J) 1.1 ppm Xylene (total) 0.31 ppm ethylbenzene (J) 0.19 ppm 4-methyl-2-pentanone (J) significant metal detections 51,348.4 ppm copper isotopics 9.88+/-0.36 pCi/g U-238 (MDA 0.01) 0.240+/-0.032 pCi/g U-235 (MDA 0.011) 7.21+/-0.27 pCi/g U-233/234 (MDA 0.03) 0.376+/-0.034 pCi/g Pu-239/240 (MDA 0.016) 0.382+/-0.050 pCi/g Am-241 (MDA 0.028)	
FT20604RG	01/28/97	Reactive sulfide and cyanide, pH, TCLP VOAs, TCLP metals	GAC from CWTF	4.8 mg/kg reactive cyanide 8.0 mg/kg reactive sulfide 7.6 pH TCLP VOAs = all non detects TCLP metals 0.0033 mg/L mercury	
DB0039RM	5/28/97	Total sulfur	GAC from CWTF	7.7 mg/kg sulfur	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name: QUANTERRA MO

Contract: 262-01

Lab Code: ITMO

Case No.: V93301

SDG No.: S1235

Matrix: (soil/water) WATER

Lab Sample ID: 11933-001

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: F6663

Level: (low/med) LOW

Date Received: 08/26/96

% Moisture: not dec.

Date Analyzed: 09/10/96

Column: (pack/cap) CAP

Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
---------	----------	--	---

75-01-4-----	Vinyl Chloride	100	U
75-35-4-----	1,1-Dichloroethene	50	U
67-66-3-----	Chloroform	120	
107-06-2-----	1,2-Dichloroethane	50	U
78-93-3-----	2-Butanone	2000	
56-23-5-----	Carbon Tetrachloride	52	
79-01-6-----	Trichloroethene	550	
71-43-2-----	Benzene	140	
127-18-4-----	Tetrachloroethene	450	
108-90-7-----	Chlorobenzene	50	U

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name: QUANTERRA, MO Contract: 262-01

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: S1233

Matrix: (soil/water) TCLP Lab Sample ID: 11933-001

Sample wt/vol: 100 (g/ml) ML

Lab File ID: _____

Level: (low/med) LOW

Date Sampled: 08-26-96

% Moisture: not dec. _____ dec. _____

Date Extracted: 09-12-96

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 09-13-96

GPC Cleanup: (Y/N) N pH: _____

Dilution Factor: 1

CAS NO.

Compound

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Q

58-89-9-----	gamma-BHC (Lindane)	0.50	U
76-14-8-----	Heptachlor	0.50	U
1024-57-3-----	Heptachlor epoxide	0.50	U
72-20-8-----	Endrin	0.50	U
72-43-5-----	Methoxychlor	1.0	U
57-74-9-----	Chlordane (technical)	5.0	U
8001-35-2-----	Toxaphene	20	U

U: Concentration of analyte is less than the value given.

FORM I PEST

000006

1D
HERBICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name: QUANTERRA, MO Contract: 262.01

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: S1232

Matrix: (soil/water) TCLP Lab Sample ID: 11933-001

Sample wt/vol: 100 (g/ml) ml Lab File ID: _____

Level: (low/med) LOW Date Sampled: 08-26-96

% Moisture: not dec. _____ dec. _____ Date Extracted: 09-16-96

Extraction: (SepL/Cont/Sonc/Shak) SEPF Date Analyzed: 09-18-96

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/L) <u>ug/L</u>	Q
---------	----------	---	---

94-75-7-----2,4-D	40	U
93-72-1-----2,4,5-TP	10	U

U: Concentration of analyte is less than the value given.

000006

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: QUANTERRA MO

Contract: 262-02

DB00012RM

Lab Code: ITMO

Case No.: S93301

SAS No.:

SDG No.: S1230

Matrix: (soil/water) WATER

Lab Sample ID: 11933-001

Sample wt/vol: 200.0 (g/mL) ML

Lab File ID: D0306

Level: (low/med) LOW

Date Received: 08/26/96

† Moisture: decanted: (Y/N)

Date Extracted: 09/19/96

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 09/20/96

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Q

110-86-1-----	Pyridine	700	E
106-46-7-----	1,4-Dichlorobenzene	50	U
95-48-7-----	2-Methylphenol	50	U
106-44-5-----	4-Methylphenol	50	U
67-72-1-----	Hexachloroethane	50	U
98-95-3-----	Nitrobenzene	50	U
87-68-3-----	Hexachlorobutadiene	50	U
88-06-2-----	2,4,6-Trichlorophenol	50	U
95-95-4-----	2,4,5-Trichlorophenol	50	U
121-14-2-----	2,4-Dinitrotoluene	50	U
118-74-1-----	Hexachlorobenzene	50	U
87-86-5-----	Pentachlorophenol	250	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RMDL

Lab Name: QUANTERRA MO

Contract: 262-02

Lab Code: ITMO

Case No.: 893301

SAS No.:

SDG No.: S1230

Matrix: (soil/water) WATER

Lab Sample ID: 11933-001DL

Sample wt/vol: 200.0 (g/mL) ML

Lab File ID: H8139

Level: (low/med) LOW

Date Received: 08/26/96

% Moisture: decanted: (Y/N)

Date Extracted: 09/19/96

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 09/22/96

Injection Volume: 2.0 (uL)

Dilution Factor: 4.0

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

Q

110-86-1-----	Pyridine	630	D
106-46-7-----	1,4-Dichlorobenzene	200	U
95-48-7-----	2-Methylphenol	200	U
106-44-5-----	4-Methylphenol	200	U
67-72-1-----	Hexachloroethane	200	U
98-95-3-----	Nitrobenzene	200	U
87-68-3-----	Hexachlorobutadiene	200	U
88-06-2-----	2,4,6-Trichlorophenol	200	U
95-95-4-----	2,4,5-Trichlorophenol	200	U
121-14-2-----	2,4-Dinitrotoluene	200	U
118-74-1-----	Hexachlorobenzene	200	U
87-86-5-----	Pentachlorophenol	1000	U



76L1091

Report Date: 09/26/95

Client ID	Quanterra ID	Analyte	Analysis Date	Result	Units	Det Lmt	Dil
DB00012RM	11933-001	Reactive Sulfide	09/04/96	<22.2	mg/kg	22.2	1
-	QCBLK111571	Reactive Sulfide	09/04/96	<4.44	mg/kg	4.44	1
-	QCLCS111571	Reactive Sulfide	09/04/96	96	%Recovery	4.44	1
DB00012RM	11933-001	Reactive Cyanide	09/03/96	0.20	mg/kg	0.10	1
-	QCBLK111378	Reactive Cyanide	09/03/96	<0.10	mg/kg	0.10	1
-	QCLCS111378	Reactive Cyanide	09/03/96	16	%Recovery	0.10	1

76L1091

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00013RM

Lab Name: QUANTERRA MO

Contract: 262-01

Lab Code: ITMO

Case No.: V93302

SDG No.: S1236

Matrix: (soil/water) WATER

Lab Sample ID: 11933-002

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: F6616

Level: (low/med) LOW

Date Received: 08/26/96

% Moisture: not dec.

Date Analyzed: 09/08/96

Column: (pack/cap) CAP

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
---------	----------	--	---

74-87-3-----	Chloromethane	10	U
74-83-9-----	Bromomethane	10	U
75-01-4-----	Vinyl Chloride	10	U
75-00-3-----	Chloroethane	10	U
75-09-2-----	Methylene Chloride	5	U
67-64-1-----	Acetone	100	U
75-15-0-----	Carbon Disulfide	5	U
75-35-4-----	1,1-Dichloroethene	5	U
75-34-3-----	1,1-Dichloroethane	5	U
156-60-5-----	trans-1,2-Dichloroethene	5	U
67-66-3-----	Chloroform	5	U
107-06-2-----	1,2-Dichloroethane	5	U
78-93-3-----	2-Butanone	100	U
71-55-6-----	1,1,1-Trichloroethane	5	U
56-23-5-----	Carbon Tetrachloride	5	U
108-05-4-----	Vinyl Acetate	50	U
75-27-4-----	Bromodichloromethane	5	U
78-87-5-----	1,2-Dichloropropane	5	U
10061-01-5-----	cis-1,3-Dichloropropene	5	U
79-01-6-----	Trichloroethene	5	U
124-48-1-----	Dibromochloromethane	5	U
79-00-5-----	1,1,2-Trichloroethane	5	U
71-43-2-----	Benzene	5	U
110-75-8-----	2-Chloroethyl Vinyl Ether	10	U
10061-02-6-----	trans-1,3-Dichloropropene	5	U
75-25-2-----	Bromoform	5	U
108-10-1-----	4-Methyl-2-Pentanone	50	U
591-78-6-----	2-Hexanone	50	U
127-18-4-----	Tetrachloroethene	5	U
79-34-5-----	1,1,2,2-Tetrachloroethane	5	U
108-88-3-----	Toluene	5	U
108-90-7-----	Chlorobenzene	5	U
100-41-4-----	Ethylbenzene	5	U
100-42-5-----	Styrene	5	U
1330-20-7-----	Xylene (total)	5	U

FORM I VOA

1/87 Rev.

0003

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: E.G.&G., Rocky Flats

Contract:

Lab Code: GLAB

Case No.:

SAS No.:

SDG No.:

Matrix: (soil/water) SOIL

Lab Sample ID: DB00015RM

Sample wt/vol: 4.000 (g/mL) G

Lab File ID: SEP1002

Level: (low/med) MED

Date Received: 09/10/96

% Moisture: not dec. 0.

Date Analyzed: 09/10/96

GC Column: DBVRX ID: .32 (mm)

Dilution Factor: 12,500

CAS NO.	COMPOUND	CONCENTRATION UNITS:	MG/KG
---------	----------	----------------------	-------

74-87-3-----	Chloromethane	120.	U
74-83-9-----	Bromomethane	120.	U
75-01-4-----	Vinyl Chloride	120.	U
75-00-3-----	Chloroethane	120.	U
75-09-2-----	Methylene Chloride	60.	U
67-64-1-----	Acetone	120.	U
75-15-0-----	Carbon Disulfide	60.	U
75-35-4-----	1,1-Dichloroethene	60.	U
75-34-3-----	1,1-Dichloroethane	60.	U
544-59-2-----	1,2-Dichloroethene (total)	62.	U
67-66-3-----	Chloroform	78.	
107-06-2-----	1,2-Dichloroethane	60.	U
78-93-3-----	2-Butanone	120.	U
71-55-6-----	1,1,1-Trichloroethane	120.	
56-23-5-----	Carbon Tetrachloride	170.	
75-27-4-----	Bromodichloromethane	60.	U
78-87-5-----	1,2-Dichloropropane	280.	
10061-01-5-----	cis-1,3-Dichloropropene	60.	U
79-01-6-----	Trichloroethene	2300.	
124-48-1-----	Dibromochloromethane	60.	U
79-00-5-----	1,1,2-Trichloroethane	60.	U
71-43-2-----	Benzene	270.	
10061-02-6-----	trans-1,3-Dichloropropene	60.	U
75-25-2-----	Bromoform	60.	U
108-10-1-----	4-Methyl-2-Pentanone	38.	J
591-78-6-----	2-Hexanone	120.	U
127-18-4-----	Tetrachloroethene	8200.	E
79-34-5-----	1,1,2,2-Tetrachloroethane	60.	U
108-88-3-----	Toluene	190.	
108-90-7-----	Chlorobenzene	60.	U
100-41-4-----	Ethylbenzene	43.	J
100-42-5-----	Styrene	16.	J
1330-20-7-----	Xylene (total)	70.	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: E.G.&G., Rocky Flats

Contract:

Lab Code: GLAB

Case No.:

SAS No.:

SDG No.:

Matrix: (soil/water) SOIL

Lab Sample ID: DB00015RM-DL

Sample wt/vol: 4.000 (g/mL) G

Lab File ID: SEP1301

Level: (low/med) MED

Date Received: 09/10/96

% Moisture: not dec. 0.

Date Analyzed: 09/13/96

GC Column: DBVRX ID: .32 (mm)

Dilution Factor: 25000

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3-----	Chloromethane	250000.	U
74-83-9-----	Bromomethane	250000.	U
75-01-4-----	Vinyl Chloride	250000.	U
75-00-3-----	Chloroethane	250000.	U
75-09-2-----	Methylene Chloride	120000.	U
67-64-1-----	Acetone	130000.	J
75-15-0-----	Carbon Disulfide	120000.	U
75-35-4-----	1,1-Dichloroethene	120000.	U
75-34-3-----	1,1-Dichloroethane	120000.	U
544-59-2-----	1,2-Dichloroethene (total)	120000.	U
67-66-3-----	Chloroform	66000.	J
107-06-2-----	1,2-Dichloroethane	120000.	U
78-93-3-----	2-Butanone	100000.	J
71-55-6-----	1,1,1-Trichloroethane	120000.	J
56-23-5-----	Carbon Tetrachloride	160000.	
75-27-4-----	Bromodichloromethane	120000.	U
78-87-5-----	1,2-Dichloropropane	240000.	
10061-01-5-----	cis-1,3-Dichloropropene	120000.	U
79-01-6-----	Trichloroethene	2100000.	
124-48-1-----	Dibromochloromethane	120000.	U
79-00-5-----	1,1,2-Trichloroethane	120000.	U
71-43-2-----	Benzene	240000.	
10061-02-6-----	trans-1,3-Dichloropropene	120000.	U
75-25-2-----	Bromoform	120000.	U
108-10-1-----	4-Methyl-2-Pentanone	250000.	U
591-78-6-----	2-Hexanone	28000.	J
127-18-4-----	Tetrachloroethene	7400000.	E
79-34-5-----	1,1,2,2-Tetrachloroethane	120000.	U
108-88-3-----	Toluene	180000.	
108-90-7-----	Chlorobenzene	120000.	U
100-41-4-----	Ethylbenzene	56000.	J
100-42-5-----	Styrene	120000.	U
1330-20-7-----	Xylene (total)	65000.	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: E.G.&G., Rocky Flats

Contract:

Lab Code: GLAB

Case No.:

SAS No.:

SDG No.:

Matrix: (soil/water) SOIL

Lab Sample ID: DB00015RM-DL

Sample wt/vol: 4.000 (g/mL) G

Lab File ID: SEP1303

Level: (low/med) MED

Date Received: 09/10/96

% Moisture: not dec. 0.

Date Analyzed: 09/13/96

GC Column: DBVRX ID: .32 (mm)

Dilution Factor: 50000

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

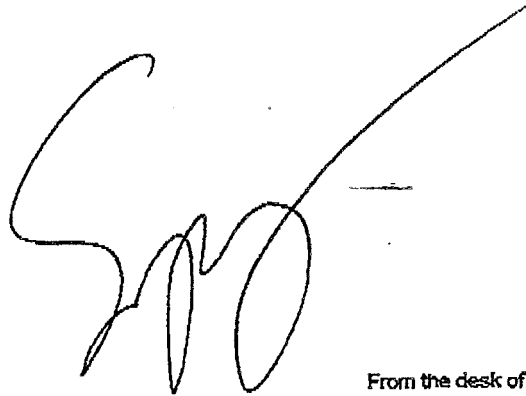
CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3-----	Chloromethane	490000.	U
74-83-9-----	Bromomethane	490000.	U
75-01-4-----	Vinyl Chloride	490000.	U
75-00-3-----	Chloroethane	490000.	U
75-09-2-----	Methylene Chloride	240000.	U
67-64-1-----	Acetone	140000.	J
75-15-0-----	Carbon Disulfide	240000.	U
75-35-4-----	1,1-Dichloroethene	240000.	U
75-34-3-----	1,1-Dichloroethane	240000.	U
544-59-2-----	1,2-Dichloroethene (total)	240000.	U
67-66-3-----	Chloroform	76000.	J
107-06-2-----	1,2-Dichloroethane	240000.	U
78-93-3-----	2-Butanone	110000.	J
71-55-6-----	1,1,1-Trichloroethane	120000.	J
56-23-5-----	Carbon Tetrachloride	150000.	J
75-27-4-----	Bromodichloromethane	240000.	U
78-87-5-----	1,2-Dichloropropane	240000.	J
10061-01-5-----	cis-1,3-Dichloropropene	240000.	U
79-01-6-----	Trichloroethene	2100000.	
124-48-1-----	Dibromochloromethane	240000.	U
79-00-5-----	1,1,2-Trichloroethane	240000.	U
71-43-2-----	Benzene	250000.	
10061-02-6-----	trans-1,3-Dichloropropene	240000.	U
75-25-2-----	Bromoform	240000.	U
108-10-1-----	4-Methyl-2-Pentanone	490000.	U
591-78-6-----	2-Hexanone	490000.	U
127-18-4-----	Tetrachloroethene	7400000.	
79-34-5-----	1,1,2,2-Tetrachloroethane	240000.	U
108-88-3-----	Toluene	180000.	J
108-90-7-----	Chlorobenzene	240000.	U
100-41-4-----	Ethylbenzene	240000.	U
100-42-5-----	Styrene	240000.	U
1330-20-7-----	Xylene (total)	52000.	J

facsimile
TRANSMITTAL

to: Norm Stoner, Kaiser Hill
fax #: 303-966-3400
re: wo 11491 samples rec'd 5-29-97
date: June 6, 1997
pages: 2, including this cover sheet.

Attached please find the sulfur results for samples received 5-29-97. Samples were run in duplicate and the average is reported. A hard copy of the data is to follow.

97A1780



From the desk of...

Sydney Gorton
Senior Technician
Southwest Research Institute
6220 Culebra Road
San Antonio, Texas 78228

210-522-2476
Fax: 210-522-2021

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Kaiser Hill

Lab Code: SwRI

Date Received: 05/29/97

Matrix: Solid

Project No.: 01-8359-164

Sample ID	Lab System ID	Sulfur Result (ug/g)
PBW	—	<150
DB00038RM	90153	945
DB00039RM	90154	7700

Detection Limit: 150 ug/g

97A1780

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

A1780

Lab Name: WESTON_FMT Contract:

Lab Code: WESEMI Case No.: SAS No.: SDG No.: ⁴⁷ A1780

Matrix (soil/water): SOIL Lab Sample ID: 9705G943-001

Level (low/med): LOW Date Received: 05/29/97

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	29.2			P
7440-36-0	Antimony	0.14	U	N	P
7440-38-2	Arsenic	0.20	U		P
7440-39-3	Barium	1.2	B		P
7440-41-7	Beryllium	0.02	B		P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	246	B		P
7440-47-3	Chromium	0.41			P
7440-48-4	Cobalt	0.08	B		P
7440-50-8	Copper	19.4		N*	P
7439-89-6	Iron	58.5			P
7439-92-1	Lead	0.32			P
7439-95-4	Magnesium	178	B		P
7439-96-5	Manganese	3.4			P
7439-97-6	Mercury	41.3			CV
7440-02-0	Nickel	0.17	B		P
7440-09-7	Potassium	6910			P
7782-49-2	Selenium	0.59	B	N	P
7440-22-4	Silver	0.89		*	P
7440-23-5	Sodium	451	B		P
7440-28-0	Thallium	0.22	U	N	P
7440-62-2	Vanadium	0.12	B		P
7440-66-6	Zinc	2.8	B		P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: GREY Clarity After: Artifacts:

Comments:

Client ID: DB00038RM

S. H.

6/1/97

CASE NARRATIVE

1.0 GENERAL

TMA/Richmond Sample Delivery Group KH2042 consists of a single carbon sample listed on Chain-of-Custody document RFP945963.

2.0 ANALYSIS NOTES

Internal quality control, in accordance with the GRRASP 3.0 protocol, consists of 10% laboratory control samples, 10% duplicates, and 5% blanks. The QC samples are prepared by the Quality Control Department. Copies of the QC Notebook pages are included in the data package.

The blanks and laboratory control samples are created using the 1989 ASTM formula for moderately hard water, listed in Table 8010: *Recommended Composition for Reconstituted Fresh Water*, and consists of the following:

NaHCO ₃	96 mg/L
CaSO ₄ ·2H ₂ O	60 mg/L
MgSO ₄	60 mg/L

KCl at 4.0 mg/L is specified in the table but is not added since KCl contains natural ⁴⁰K that raises the gross beta background.

2.1 Isotopic Thorium

As a result of contamination in the method blank during the original analysis the sample was reanalyzed with new QC samples. No problems were encountered during the reanalysis. Thorium-230 is reported as a less than value for the sample and duplicate results.

2.2 Uranium-233/234, 235, and 238 Analyses

No problems were encountered with the analyses.

2.3 Plutonium-239/240 Analyses

The relative percent difference in the Pu 239/240 results for the sample and the duplicate was 92%, greater than the 3σ total limit of 60%.

2.4 Americium-241 Analyses

No problems were encountered with the analyses.

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-03

Method Blank

METHOD BLANK

SDG KH2042Client Kaiser-HillContact N. Joseph VervilleContract KH-224141EA3Lab sample id N705081-03Client sample id Method BlankDept sample id 2042-003Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0	0.002	0.005	0.03	U	PU
Plutonium 239/240	10-12-8	-0.001	0.001	0.004	0.03	U	PU
Uranium 233/234	11-08-5	0	0.012	0.05	0.3	U	U
Uranium 235	15117-96-1	0	0.015	0.06	0.3	U	U
Uranium 238	7440-61-1	0	0.012	0.05	0.3	U	U
Americium 241	14596-10-2	0.004	0.003	0.003	0.02	J	AM

CC-BLANK 26970

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-DSVersion 3.06Report date 06/23/97

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-06

Method Blank

METHOD BLANK

SDG KH2042Client Kaiser-HillContact N. Joseph VervilleContract KH-224141EA3Lab sample id N705081-06Client sample id Method BlankDept sample id 2042-006Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 230	14269-63-7	< 0.3		0.3	0.5	UX	TH
Thorium 232	7740-29-1	0.026	0.022	0.03	0.5	U	TH

QC-BLANK 27032

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-DSVersion 3.06Report date 06/23/97

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 8

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG KH2042Contact N. Joseph VervilleClient Kaiser-HillContract KH-224141EA3Lab sample id N705081-02Client sample id Lab Control SampleDept sample id 2042-002Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2 σ ERR pCi/g	REC %	3 σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	0.34	0.029	0.007	0.03		PU	0.340	0.014	100	84-116	
Plutonium 239/240	0.34	0.029	0.004	0.03		PU	0.309	0.012	110	83-117	
Uranium 233/234	4.8	0.49	0.2	0.3		U	4.86	0.19	99	82-118	
Uranium 235	3.9	0.42	0.05	0.3		U	3.72	0.15	105	80-120	
Uranium 238	4.6	0.47	0.2	0.3		U	4.83	0.19	95	83-117	
Americium 241	0.32	0.027	0.006	0.02		AM	0.301	0.012	106	83-117	

CS 26969

LAB CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 9

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-LCSVersion 3.06Report date 06/23/97

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-05

Lab Control Sample

LAB CONTROL SAMPLE

SDG KH2042Contact N. Joseph VervilleClient Kaiser-HillContract KH-224141EA3Lab sample id N705081-05Client sample id Lab Control SampleDept sample id 2042-005Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2 σ ERR pCi/g	REC %	3 σ LMTS (TOTAL)	PROTOCOL LIMITS
Thorium 230	6.3	0.30	0.04	0.5		TH	6.13	0.25	103	88-112	

QC-LCS 27031

LAB CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-LCSVersion 3.06Report date 06/23/97

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-04

DB00038RM

DUPLICATE

SDG KH2042Contact N. Joseph Verville

DUPLICATE

Lab sample id N705081-04Dept sample id 2042-004

ORIGINAL

Lab sample id N705081-01Dept sample id 2042-001Received 05/29/97Client Kaiser-HillContract KH-224141EA3Client sample id DB00038RMLocation/Matrix SOILCollected 05/28/97 09:45Chain of custody id RFP945963

ANALYTE	DUPLICATE pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2 σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3 σ PROT TOT LIMIT
Plutonium 238	0.003	0.005	0.008	0.03	U	PU	0.002	0.003	0.006	U	-	
Plutonium 239/240	0.035	0.008	0.005	0.03		PU	0.013	0.005	0.005	J	92	60
Uranium 233/234	0.039	0.034	0.04	0.3	U	U	0.037	0.032	0.04	U	-	
Uranium 235	0.014	0.014	0.05	0.3	U	U	0.013	0.013	0.05	U	-	
Uranium 238	0.17	0.068	0.04	0.3	J	U	0.20	0.066	0.04	J	16	78
Americium 241	0.006	0.004	0.005	0.02	J	AM	0.004	0.004	0.004	J	40	171

QC-DUP#1 26971

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 11

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-DUPVersion 3.06Report date 06/23/97

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-07

DB00038RM

DUPLICATE

SDG KH2042Contact N. Joseph Verville

DUPLICATE

Lab sample id N705081-07Dept sample id 2042-007Client Kaiser-HillContract KH-224141EA3

ORIGINAL

Lab sample id N705081-01Dept sample id 2042-001Received 05/29/97Client sample id DB00038RMLocation/Matrix SOILCollected 05/28/97 09:45Chain of custody id RFP945963

ANALYTE	DUPLICATE pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2 σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3 σ PROT TOT LIMIT
Thorium 230	< 0.1		0.1	0.5	UX	TH	< 0.1		0.1	UX	-	
Thorium 232	-0.003	0.006	0.02	0.5	U	TH	-0.004	0.007	0.03	U	-	

QC-DUP#1 27033

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-DUPVersion 3.06Report date 06/23/97

DUPLICATES

Page 2

SUMMARY DATA SECTION

Page 12

TMA

SAMPLE DELIVERY GROUP KH2042

N705081-01

DB00038RM

DATA SHEET

SDG KH2042Client Kaiser-HillContact N. Joseph VervilleContract KH-224141EA3Lab sample id N705081-01Client sample id DB00038RMDept sample id 2042-001Location/Matrix SOILReceived 05/29/97Collected 05/28/97 09:45Chain of custody id RFP945963

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.002	0.003	0.006	0.03	U	PU
Plutonium 239/240	10-12-8	0.013	0.005	0.005	0.03	J	PU
Uranium 233/234	11-08-5	0.037	0.032	0.04	0.3	U	U
Uranium 235	15117-96-1	0.013	0.013	0.05	0.3	U	U
Uranium 238	7440-61-1	0.20	0.066	0.04	0.3	J	U
Americium 241	14596-10-2	0.004	0.004	0.004	0.02	J	AM
Thorium 230	14269-63-7	< 0.1		0.1	0.5	UX	TH
Thorium 232	7740-29-1	-0.004	0.007	0.03	0.5	U	TH

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol GRRASPVersion Ver 3.0Form DVD-DSVersion 3.06Report date 06/23/97

96L0236

891

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: ROCKY FLATS ANALYTICAL

Contract:

L02361

Lab Code: B559

Case No.:

SAS No.: 97L

SDG No.: L0236A

Matrix (soil/water): SOIL

Lab Sample ID: FT20601RG

Level (low/med): LOW

Date Received: 12/05/97

* Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver				
7440-38-2	Arsenic	2.0		N	F
7440-43-9	Cadmium				
7440-46-2	Cesium	5.0	U		A
7439-97-6	Mercury				
7439-92-1	Lead	8.7			F
7782-49-2	Selenium	1.6			F
7440-28-0	Thallium	0.50	U		F

Color Before: BROWN

Clarity Before: CLOUDY

Texture: COURSE

Color After: BROWN

Clarity After: CLOUDY

Artifacts: YES

Comments:

1/17/97

DEC-10-96 TUE 10:44

BLDG 881 ROOM 212

FAX NO. 303 966 3400

P.06

DEC-10-96 TUE 14:44

GENERAL LABORATORY 881

FAX NO. 303 966 4385

P.08

P.07

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

23601

Lab Name: E.G.&G., Rocky Flats

Contract:

Lab Code: GLAB

Case No.:

SAS No.: 97L0

SDG No.:

GAC

Matrix: (soil/water) SOIL

Lab Sample ID: FT20601RG

Sample wt/vol: 4.000 (g/mL) G

Lab File ID: DEC0901

Level: (low/med) MED

Date Received: 12/05/96

% Moisture: not dec. Not Det.

Date Analyzed: 12/09/96

GC Column: DBVRX ID: .32 (mm)

Dilution Factor: 125.0

Soil Extract Volume: 10000. (uL)

Soil Aliquot Volume: 100. (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

74-87-3-----	Chloromethane	1200.	U
74-83-9-----	Bromomethane	1200.	U
75-01-4-----	Vinyl Chloride	1200.	U
75-00-3-----	Chloroethane	1200.	U
75-09-2-----	Methylene Chloride	600.	U
67-64-1-----	Acetone	720.	BJ
75-15-0-----	Carbon Disulfide	600.	U
75-35-4-----	1,1-Dichloroethene	600.	U
75-34-3-----	1,1-Dichloroethane	600.	U
544-59-2-----	1,2-Dichloroethene (total)	620.	U
67-66-3-----	Chloroform	600.	U
107-06-2-----	1,2-Dichloroethane	600.	U
78-93-3-----	2-Butanone	540.	BJ
71-55-6-----	1,1,1-Trichloroethane	330.	J
56-23-5-----	Carbon Tetrachloride	600.	U
75-27-4-----	Bromodichloromethane	600.	U
78-87-5-----	1,2-Dichloropropane	600.	U
10061-01-5-----	cis-1,3-Dichloropropene	600.	U
79-01-6-----	Trichloroethene	830.	U
124-48-1-----	Dibromochloromethane	600.	U
79-00-5-----	1,1,2-Trichloroethane	600.	U
71-43-2-----	Benzene	600.	U
10061-02-6-----	trans-1,3-Dichloropropene	600.	U
75-25-2-----	Bromoform	600.	U
108-10-1-----	4-Methyl-2-Pentanone	190.	J
591-78-6-----	2-Hexanone	1200.	U
127-18-4-----	Tetrachloroethene	12000.	U
79-34-5-----	1,1,2,2-Tetrachloroethane	600.	U
108-88-3-----	Toluene	390.	J
108-90-7-----	Chlorobenzene	600.	U
100-41-4-----	Ethylbenzene	310.	J
100-42-5-----	Styrene	600.	U
1330-20-7-----	Xylene (total)	1100.	U

DEC-10-96 TUE 10:40

BLDG 881 ROOM 212

FAX NO. 303 966 3400

P.07

DEC-10-96 TUE 14:44

GENERAL LABORATORY 881

FAX NO. 303 966 4385

P.07

P.08

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

23601

Lab Name: E.G.&G., Rocky Flats

Contract:

Lab Code: GLAB

Case No.:

SAS No.: 97L0

SDG No.:

Matrix: (soil/water) SOIL

Lab Sample ID: FT20601RG

Sample wt/vol: 4.000 (g/mL) G

Lab File ID: DEC0901

Level: (low/med) MED

Date Received: 12/05/96

% Moisture: not det. Not Det.

Date Analyzed: 12/09/96

GC Column: DBVRX ID: .32 (um)

Dilution Factor: 125.0

Soil Extract Volume: 10000. (uL)

Soil Aliquot Volume: 100. (uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 470-82-6	Eucalyptol	30.42	800.	J N
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM 1 VOA-TIC

3/90

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 861 General Laboratories Sample No.: 1

APC Sample ID: 97L0236-001 FT20601K0 RS9

Section: ICPAES

% Solids (0 = N/A): 100.00 BDG No.: DEC17.001

Date Sampled: 12/05/96 QC Report No.: 97L0236.CPT

Lab Receipt Date: 12/05/96

Report Date: 12/17/96

Matrix Level (Soil, Water): OTHER

BDW No.: N/A

Contract: N/A

LOW

Elements Identified and Measured

Concentration Units: (MG/KG) As Received

Gas No.	Analyte	Concentration	Q	Q	M
7426-80-5	Aluminum	494.1			P
7440-38-0	Antimony	19.9	U	N	P
7440-38-2	Arsenic	79.4	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	1.4	B		P
7440-43-0	Cadmium	2.8	U		P
7440-70-2	Calcium	1553.4	B		P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	4.0	U		P
7440-50-8	Copper	81348.4			P
7439-89-8	Iron (L)	2353.1			P
7439-89-8	Iron (H)	2157.8			P
7439-92-1	Lead	36.4	U		P
7439-93-2	Lithium	2.0	U		P
7439-95-4	Magnesium	112.6	B		P
7439-96-5	Manganese	9.1	B		P
7439-98-7	Molybdenum	9.9	U	N	P
7440-02-0	Nickel	12.2	U		P
7440-09-7	Potassium	498.4	U		P
7782-49-2	Selenium	33.1	U		P
7440-21-3	Silicon	231.6		N	P
7440-22-4	Silver	80.3			P
7440-23-3	Sodium	80.8	B		P
7440-24-6	Strontium	28.4	B		P
7440-31-5	Tin	12.4	B		P
7440-32-8	Titanium	72.9			P
71-03-8	Uranium	79.4	U		P
7440-62-2	Vanadium	4.8	B		P
7440-68-6	Zinc	39.5			P

Color Before: Black Clarity Before: Opaque

Color After: Green Clarity After: Clear

Texture:

Appearance: Coarse mesh black particulates left over after total metals digestion.

Comments: Sample = 100.00 % Solids. CLP Total Metals Digestion Results (Deionized Water R Blank PBW is the Reagent Blank for this Sample Set. TL channel not operational.

FAXED APO

12/18/96

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

L02361

Lab Name: ROCKY FLATS ANALYTICAL

Contract:

Lab Code: B559

Case No.:

SAS No.: 97L

SDG No.: L0236

Matrix (soil/water): SOIL

Lab Sample ID: FT20601RG

Level (low/med): LOW

Date Received: 12/05/96

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver				
7440-38-2	Arsenic				
7440-43-9	Cadmium				
7440-46-2	Cesium				
7439-97-6	Mercury	2.5			CV
7439-92-1	Lead				
7782-49-2	Selenium				
7440-28-0	Thallium				

Color Before: N/A

Clarity Before: N/A

Texture: N/A

Color After: N/A

Clarity After: N/A

Artifacts: N/A

Comments:

General Lab, Building 881

Lab Number: 97L0236

Report Date: 1/22/97

Sample Date: 12/05/96

RADIOCHEMISTRY REPORT
ISOTOPIC ANALYSIS RESULTS BY ALPHA SPECTROMETRY

SAMPLE ID	PLUTONIUM 239/240 (pCi/g)	BATCH #
FT20601RG	0.376 ± 0.034 (MDA 0.016)	ISO97-002
FT20601RG D	0.320 ± 0.038 (MDA 0.030)	ISO97-002

SAMPLE ID	AMERICIUM 241 (pCi/g)	BATCH #
FT20601RG	0.382 ± 0.050 (MDA 0.028)	ISO97-002
FT20601RG D	0.276 ± 0.037 (MDA 0.023)	ISO97-002

GAC

General Lab, Building 881

Lab Number: 97L0236

Report Date: 1/22/97
Sample Date: 12/05/96**RADIOCHEMISTRY REPORT**
ISOTOPIC ANALYSIS RESULTS BY ALPHA SPECTROMETRY

SAMPLE ID	URANIUM 238 (pCi/g)	BATCH #
FT20601RG	9.88 ± 0.36 (MDA 0.01)	ISO97-002
FT20601RG D	8.80 ± 0.31 (MDA 0.01)	ISO97-002

SAMPLE ID	URANIUM 235 (pCi/g)	BATCH #
FT20601RG	0.240 ± 0.032 (MDA 0.011)	ISO97-002
FT20601RG D	0.231 ± 0.030 (MDA 0.010)	ISO97-002

SAMPLE ID	URANIUM 233/234 (pCi/g)	BATCH #
FT20601RG	7.21 ± 0.27 (MDA 0.03)	ISO97-002
FT20601RG D	5.96 ± 0.22 (MDA 0.03)	ISO97-002

GAC

General Inorganics

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL
Authorized: 29 JAN 97

Sampled: 28 JAN 97
Prepared: See Below

Received: 29 JAN 97
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Cyanide, Reactive	4.8	mg/kg	0.20	9010	04 FEB 97	07 FEB 97
Sulfide, Reactive	8.0	mg/kg	5.0	9030	04 FEB 97	10 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Judy Lange

Approved By:

FEB 12 '97 15:15 FR

TO 9863400

P.47/52

General Inorganics

97L0242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL
Authorized: 29 JAN 97

Sampled: 28 JAN 97
Prepared: See Below

Received: 29 JAN 97
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	7.6	units	0.10	150.1	NA	06 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Mark Foster

Approved By:

*Spent GAC*VGA/TCLP-Analysis by SW846 8240B-Regulated
TCLP Leachate
Method 8240B

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOILSampled: 28 JAN 97
Received: 29 JAN 97
Authorized: 29 JAN 97Leached: 30 JAN 97
Prepared: 30 JAN 97
Analyzed: 10 FEB 97

Parameter	Result	Units	Reporting Limit
Benzene	ND	mg/L	0.50
2-Butanone	ND	mg/L	200
Carbon tetrachloride	ND	mg/L	0.50
Chlorobenzene	ND	mg/L	100
Chloroform	ND	mg/L	6.0
1,2-Dichloroethane	ND	mg/L	0.50
1,1-Dichloroethene	ND	mg/L	0.70
Tetrachloroethene	ND	mg/L	0.70
Trichloroethene	ND	mg/L	0.50
Vinyl chloride	ND	mg/L	0.20

Surrogate	Recovery	
1,2-Dichloroethane-d4	94	%
4-Bromofluorobenzene	102	%
Toluene-d8	102	%

ND = Not detected
NA = Not applicable

Reported By: Steven Francis

Approved By: Audrey Cornell

Metals
TCLP Leachate

97L0242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOILSampled: 28 JAN 97 Leached: 04 FEB 97
Received: 29 JAN 97 Prepared: See Below
Authorized: 29 JAN 97 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Barium	ND	mg/L	100	CLP ILM03.0	06 FEB 97	06 FEB 97
Cadmium	ND	mg/L	1.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Chromium	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Lead	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Mercury	0.0033	mg/L	0.0010	CLP ILM03.0	10 FEB 97	10 FEB 97
Selenium	ND	mg/L	1.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Silver	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer

Approved By: Jamie Wickham

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Date: August 26, 1996

Sample Team Leader: Erik Thompson - MH

Project Number: 951878ES

Member: Haji Salomon

Log Book Number: ERPD-OU2-LB-96-00176

Member: Larry Scott

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv.	Analyses Requested	COC #
0705	NA DB	DB00011RM	CONDENSER	System 2	4oz G	REAL	NONE	S	4°C	VX	RFP900414

MH
8/26/96

Comments: Sample came from bottom of System 2 condenser. Sample is silt/clay fraction w/ lots of water

0705	NA DB	DB00011RM	CONDENSER	System 2	P, 250 ml	REAL	NONE	S	NONE	RH	RFP945935
------	-------	-----------	-----------	----------	-----------	------	------	---	------	----	-----------

MH
8/26/96

Comments: SAME comment as above

1050	NA DB	DB00012RM	DRUM FROM GAC, SYSTEM 1	G, 500 ml	REAL	(Trip blank)	S	4°C	SFA - TELP VOA SFB - TELP SYOC SFC - TELP Post/Pre SFD - TELP metals	RFP900415
------	-------	-----------	-------------------------	-----------	------	--------------	---	-----	---	-----------

Comments: See Attached comment sheet for explanation.

1050	NA DB	DB00013RM	NA	(2) G, 40 ml	(REAL)	Trip b. DB00012RM	W	4°C HCl, pH 2	VBC	RFP900415
------	-------	-----------	----	--------------	--------	-------------------	---	---------------	-----	-----------

Comments:

Comments:

Sampler: Haji Salomon 8/26/96
Print Sign Date

QC/Peer Review: MH

Page of

Sign

Date

8/26/96

DB00012RM

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Project Number: 951878ES

Log Book Number: ERPD-OU2-LB-96-00176

Date: August 26, 1996

Sample Team Leader: Randy Scott

Member: Hapi Salomon

Member:

Comments: comments on sample # DB00012RM

Sample DB00012RM was collected to meet the analytical requirements to determine if the Spent T-3/T-4 GAC can be classified as non-hazardous, and be eventually shipped to Envirocare of Utah, Inc., for commercial disposal as LLW. The sample was collected by Randy Scott of M-H in keel B PPE from drum # D87122 which is spent GAC from System 1 of the M-H TDU system. This GAC was used for the entire project in the system 1 Carbon bed and recently transferred to a waste drum. When opened, an FID was placed into the drum and VOCs were measured >1000 ppm. System 1 GAC was chosen because both the RWRS Supervisor (treatment) Mark Wood, and the M-H project Supervisor, Ben Hill, have confidence that System 1 GAC, because of its use through-out the project, would have the greatest probability for being classified as a hazardous waste. Therefore, this sample is expected to represent a worst case scenario. The sample was collected directly from the drum to the sample jar, (no sampling equip used).

Verification of statement above: Mark R. Wood RWRS TDU Field Supervisor 8/26/96

Sampler: Hapi Salomon
Print

Sign

8/26/96
Date

QC/Peer Review: SHAWN KARNER
Print

Sign

8/26/96
Date

Ronnie D. Hill, M-H Superintendent

SAMPLERS Erik Thompson (M-H), Hopi Silmonow, Rudy Scott ANALYTICAL CHARGE # 951878AW

4046
FAX Ext 4046
LAB/LOCATION Q-SL

RFP300415

EG&G ROCKY FLATS, CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS
8/24/16	1050	DB00012RM	Drums from GAL. SYSTEM I	6, 500 ml
8/28/16	1050	DB00013RM	N/A	6, 40 ml

NUMBER OF CONTAINERS	
MEDIA: S=SOIL, W=WATER, S=SEALED	
F=FILTERED, U=UNFILTERED	
R=TURN AROUND RUSH	
OUT OF SPEC REPORTS	

BOTTLE CODES PRESERVATIVE	COOLED TO 4°C
	NaOH
	HNO ₃
	H ₂ SO ₄
	HCl

VOA - CLP					
VOA - 524.2 com.					
BNA - CLP					
PCBs/PEST CLP					

M			TOTAL Metals-CLP+(1)
M	*		ANALYSIS, Metals-CLP+(1)
W	A	A	WATER QUALITY (2)
W	B	C	NH ₃ -N/NO ₂ as N
W	B	A	IHL & GREASE
W	B	A	Ortho-Phosphate
W	D	A	CHLORIDE
W	E		OD
W	G		OC
W	H		OC
W	I		225
W	J		VI
W	K	A	6.1 WBS 8240
V	B	C	TCLP YDA
S	F	A	TCLP SVOL
S	F	B	

Date	Time	Location	Drum #	Volume (ml)	Notes
8/26/94	1050	D800012RM	NA	1 S U	X
8/26/94	1050	D800013RM	NA	2 W U	X

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	LABORATORY USE ONLY	Y	N
<i>[Signature]</i>	2/26/96	<i>[Signature]</i>	1415	PCKG REC'D/CUSTODY SEALS INTACT		<input checked="" type="checkbox"/>
<i>[Signature]</i>	2/26/96	<i>[Signature]</i>	1420	SAMPLE LABELS/COCs AGREE		<input checked="" type="checkbox"/>
				TEMPERATURE WITHIN SPECIFICATION	<u>2</u>	<u>C</u>
				CORRECTED COPY ATTACHED		
REMARKS				PROBLEMS OR DISCREPANCIES		
(1) INCLUDES Cs, Li, Sr, Mo, Si, Sn (2) TSS, TDS, Cl, F, SO4, CO3, HCO3;				SHIPMENT METHOD: Fed X AIR BILL NO.: 6648146562		

AF-47987 (8/93)

Ship WHITE and YELLOW copies with samples – Retain GREEN field copy

Ship WHITE and YELLOW copies with samples – Retain
Deliver BLUE copy to RFEDS with Datacap Transmittal

Form: EGGRFP-081393-GWCOCGC-v1 1

FAX Results to Hadi Solomon 1203) 966-4046
Deliver BLUE copy to RHEDS with

0139

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Project Number: 951878ES

Log Book Number: ERPD-OU2-LB-96-00176

Date:

9/10/96

Sample Team Leader:

RE KENLOW

Member:

WA SEARLE

Member:

H SALOMON

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv.	Analyses Requested	COC #
1103	N/A	DB	DB00015RM	DRUM FROM GAC SYSTEM	4 OZ G	Real	N/A	S	4°C	VX	RFP 900417
Comments: GAC FROM DRUM DB7122. 18 ppm READING ON OVM ON CONTACT WITH GAC.											
1138	N/A	DB	DB00016RM	UNTREATED HEPA	4 OZ G	Real	N/A	S	4°C	VX	RFP 900417
Comments:											
1138	N/A	DB	DB00017RM	UNTREATED HEPA	4 OZ G	Real	N/A	S	4°C	VX	RFP 900417
Comments:											
1126	N/A	DB	DB00018RM	RMRS GREEN CANVAS TARP	4 OZ G	Real	N/A	S	4°C	VX	RFP 900417
Comments:											
1126	N/A	DB	DB00019RM	RMRS GREEN CANVAS TARP	4 OZ G	Real	N/A	S	4°C	VX	RFP 900417
Comments:											

Sampler: *H Salomon*

Print

9/10/96

Date

QC/Peer Review:

9/10/96

Sign

Page _____ of _____

Date

9578-3 AN

1992

100

EG&G ROCKY FLATS, CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS
9/10/86	1103	DB00015RM	RUM ROOM SAC SYSTEM I	402 G
	1138	DB00016RM	UNTESTED HEXAD	
	1130	DB00017RM	UNTESTED HEXA	
	1126	DB00018RM	MIX GREEN CANVAS TAPE	
	1126	DB00019RM	MIX GREEN CANVAS TAPE	
	1130	DB00020RM	MIX YELLOW CANVAS TAPE	
	1130	DB00021RM	MIX YELLOW CANVAS TAPE	
	1146	DB00022RM	UNTESTED AETHAL	
	1147	DB00023RM	UNTESTED AETHAL	
	1150	DB00024RM	UNTESTED WOOD	
12/21/86	1151	DB00025RM	UNTESTED WOOD	
	1121	DB00026RM	SEMI-DETERIORATED DECOR O/S	

#7 # 9/10/96
~~9/10/96~~

RELINQUISHED BY	DATE/TIME		RECEIVED BY	DATE/TIME		LABORATORY USE ONLY		Y	N
<i>[Signature]</i>	9/10/96	1447	<i>[Signature]</i>	9-10-96	1447	PCKG REG'D/CUSTODY SEALS INTACT	<input checked="" type="checkbox"/>		
						SAMPLE LABELS/COC'S AGREE	<input checked="" type="checkbox"/>		
						TEMPERATURE WITHIN SPECIFICATION	<input checked="" type="checkbox"/>		
						CORRECTED COPY ATTACHED	<input checked="" type="checkbox"/>		
REMARKS	(1) INCLUDES Cs, Li, Sr, Mo, Si, Sn (2) TSS, TDS, Cl, F, SO ₄ , CO ₃ , HCO ₃				SHIPMENT METHOD: <u>HAND DEL</u>				
					AIR BILL NO.: <u>N/A</u>				
PROBLEMS OR DISCREPANCIES									

[illegible]

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Project Number: 951878ES

Log Book Number: ERPD-OU2-LB-96-00176

Date: MAY 28, 1997

Sample Team Leader: Hopi Salomon

Member: William Searle (Collecting SAMPLE)

Member: Ray Kellow - Assisting

Note: SAMPLES OF SPENT GAC to support incineration at INEEL WERF INCINERATOR

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv.	Analyses Requested	COC #
0945	NA DB	DB	(97A1780-001-002)	D87122	glass, 125 ml	REAL	NONE	S	NONE	Pu, Am, U, Th	REF 945963
Sniffed drum # D87122 after lid was removed outside of 2 plastic liners with Jerome mercury vapor analyzer. Trace mercury 0.003 mg/m ³ was detected. Would expect higher levels if we had sniffed inside inner bag. Jerome Serial # = 2536, calibrated by Steve Aldredge 4/16/97. Comments: morning. This GAC originated from system I of the B3/T4 TDU system (worst case). This drum was previously sampled (D80003RM, D80004RM, D80005RM).											
0945	NA DB	DB	(97A1780-001-001)	D87122	glass, 250 ml	REAL	NONE	S	4°C	(SS058003)	Total metals + Hg REF 900449
SAME AS ABOVE											
Comments:											
0945	NA DB	DB	(97A1780-001-003)	D87122	glass, 125 ml	REAL	NONE	S	4°C	Total Sulfur	REF 900450
SAME AS ABOVE.											
Comments:											
1015	NA DB	DB	(97A1780-002-001)	D87309	glass, 125 ml	REAL	NONE	S	4°C	Total Sulfur	REF 900450
Sniffed drum D87309 contents (inside inner bag) with Jerome mercury vapor analyzer - No mercury detected. PPE, sampling scoops are being disposed by Mike Rapping. Steve Aldredge evaluated (sniffed) bag of PPE, scoops with OVA, Mercury vapor analyzer and detected nothing. Comments: This GAC originated from the CWTF (Building 851)											

Comments:

~~5/28/97~~

Sampler: Hopi Salomon Will Searle 5/28/97
Print Date

Page of

QC/Peer Review: Steve Aldredge

Sign

Date

1. of

SAMPLERS	Signature	Re	5/08/03	5/08/03	5/08/03


REPORT IDENTIFICATION NUMBER (RIN) 97A1780

RFETS CONTRACTOR RMRS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX	Cooled	NaOH	HNO3	H2 SO4	HCl	SSA	Total
5/28/97	0945	001	001	DB00038RM	D87123	Glass, 250-ml	GAC	X					U	

5/28/97

Relinquished By:	Received By: Organization	Date	Time	LABORATORY USE ONLY	Y/N
RZ		5/22/97	1100	PKG REC'D/CUSTODY SEALS INTACT	
				SAMPLE LABELS/COCs AGREE	
				TEMPERATURE AT TIME OF RECEIPT ____ °C	
REMARKS:				Charge #	C80330TY
				Project #	
Required delivery time:	Overnight Delivery <input checked="" type="checkbox"/>	2-Day Delivery <input type="checkbox"/>	Air Bill No. _____		

COC # RFP 945963

14 Day Turn Around

SAMPLERS (Signature) Dr. Sean

510963

1 Re

510885

Thermo-NutechREPORT IDENTIFICATION NUMBER (RIN) 97A1780LAB/LOCATION: Thermo-Nutech - NorcalRFETS CONTRACTOR RMS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX
5/28/97	0945	001	002	DB00038RM	D87123	125 ml g/l	GAC

Preservation				Analysis			
NaOH	HNO3	H2SO4	HCl	Isotopic Pu, Am, U	Isotopic Thorium		
				X	X		

Relinquished By:

Received By Organization

Date

Time

LABORATORY USE ONLY

N/A

5/28/97 1100

5/28/97 1000

PKG REC'D/CUSTODY SEALS INTACT

SAMPLE LABELS/COCs AGREE

TEMPERATURE AT TIME OF RECEIPT ____ °C

REMARKS:

Charge # C8033074

Project #

Time:

Overnight Delivery ☒2-Day Delivery ☐

Air Bill No. _____

3 Day turn-around

1. 20/11/2015

LAB/LOCATION: Southwest Research Lab

RFETS CONTRACTOR RMRS

2017-1401

Cooled	NaOH	HNO ₃	H ₂ SO ₄	HCl
--------	------	------------------	--------------------------------	-----

Relinquished By: <i>Re</i>	Received By/Organization <i>5/28/97 1100</i>	Date <i>5/28/97</i>	Time <i>1100</i>	LABORATORY USE ONLY	NYN
				PKG REC'D/CUSTODY SEALS INTACT	
				SAMPLE LABELS/COCs AGREE	
				TEMPERATURE AT TIME OF RECEIPT ____ °C	
REMARKS:				Charge # <i>C80330T4</i>	
				Project #	
Required delivery time:		Overnight Delivery <input checked="" type="checkbox"/>	2-Day Delivery <input type="checkbox"/>	Air Bill No. _____	



Rocky Mountain
Remediation Services, L.L.C.
... protecting the environment

INTEROFFICE MEMORANDUM

DATE: February 20, 1997

TO: M. K. Pepping, Operations, T893B, X3075

FROM: JRC^c J. R. Cirillo, Water Treatment and Management, T891B, X5876

SUBJECT: CHARACTERIZATION OF SPENT GRANULAR ACTIVATED CARBON AND ION
EXCHANGE RESIN - JRC-006-97

Action: Ensure proper characterization

Recently five drums of Ion Exchange (IX) resin and 20 drums of Granular Activated Carbon (GAC) were generated under the treatment activities at the Building 891 treatment facility. A review of these wastes is necessary to ensure proper characterization, handling, storage, and disposal. Both standard analysis and TCLP sampling were performed for anticipated constituents.

Samples were taken for radioactive constituents on both the ion exchange and granular activated carbon. The carbon exhibited low levels of radioactive elements above "background" levels and qualifies as a low level waste per radiological engineering written guidance. The ion exchange resin is designed to remove uranium contamination which was confirmed with sample results of ~500 pci/g total uranium. This waste also qualifies as a low level waste.

Both the ion exchange resin and the granular activated carbon were used to treat F-listed, contained-in wastes. Therefore, the carbon and IX resin would also be considered hazardous waste unless a reasonable argument could be presented that all of the F-listed constituents had been removed prior to contact with the IX treatment media. In this case, this type of positive proof can not be established and the wastes will therefore remain listed hazardous wastes.

The results that were received on the ion exchange resin indicate that it meets LDRs, i.e., it is not prohibited from land disposal. However, the granular activated carbon analysis indicates that the waste does not meet the land disposal treatment standard of 6.0 ppm for tetrachloroethene. The result of 24 ppm tetrachloroethene is well above the standard. Therefore, the granular activated carbon is subject to the prohibition on land disposal and will either have to be treated before disposal or handled in an alternative fashion (i.e., regeneration, incineration etc.).

Please feel free to contact me if you have any questions.

JRC:slm

cc:
J. E. Law
J. P. Schmuck
A. M. Tyson
RMRS Records

Post-it® Fax Note	7671	Date	# of pages
To	Hop, Solomon	From	JRC Cirillo
Co./Dept.		Co.	
Phone #		Phone #	
Fax #	4046	Fax #	

11/11/96 CB CX Bogert + DK Olson sampling out remotes. Samples were taken w/ stainless beaker. Bottles were prepreserved + pH's confirmed except VOA's. Samples were chilled w/ Blue ice + delivered to 7891C/881 lab. pH/cond/temp were taken @ 7891C/881 lab. CK20000 97LO231

Gen Chem: RFP902808 2 hand carry to 881 11/11/96

Rads: RFP943266 S

Sample	Location	Time	°C	pH	Cond (µs/cm)	Comments
ET20598RG	SW059	1310	18.0	6.88	811	
ET20599RG	SW061	1255	18.0	6.79	729	
ET20600RG	SW032	1240	19.0	7.19	357	Not flowing
Bottles are the same for the three locations:						
				3 x 40 mL G	HCL	524.2
				1 x 1 L P	HNO ₃	T. Metals CAP (S+A)
				2 x 4 L P	HNO ₃	T. 2 B Pu Am, 11/30

CX Bogert

12/5/96 CB CX Bogert + WJ Todino sampling spent GAC at the CWTF. Sample was taken from drum filled ~1/3 full from top of GAC unit. GAC was vacuummed + shoveled into drum. Sampled into a stainless bowl + bottles were filled from this bowl. Sample was chilled w/ Blue ice + transferred to 881 and 7891C refrig. CK20000 97LO236

VOA, metals: RFP902811 2 to 881 12/5/96 hand carry

Rads: RFP943272 S

SVOC, CN⁻: RFP902812 to QDEN 12/6/96 hand carry

Sample	Location	Time	Comment
ET20601RG	RS9	0930	GRAB of GAC - Spent.
ET20602RG	RS9	0930	Trip Blank
Bottles: GAC		2 x 120 mL G	T. + Ammonable CN ⁻ , SVOC's
		1 x 120 mL G	VOA 8260 + TIC's
		1 x 120 mL P	T. Metals Pu Am 11/30 R
TB		2 x 40 mL G	HCL VOA 8260 + TIC's.

CX Bogert

CONTRACT

Boart
SITE CONTACT/PHONE

EG&G-ROCKY FLATS, CHAIN OF CUSTODY

RadioChemistry

[illegible][illegible][illegible]

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	LABORATORY USE ONLY	Y	N
<i>[Signature]</i>	12/5/90 1335	<i>[Signature]</i>	12/6/90 1335	PCKG REC'D/CUSTODY SEAL'S INTACT	<input checked="" type="checkbox"/>	<input type="checkbox"/>
				SAMPLE LABELS/COCs AGREE	<input checked="" type="checkbox"/>	<input type="checkbox"/>
				TEMPERATURE WITHIN SPECIFICATION	<input checked="" type="checkbox"/>	<input type="checkbox"/>
				CORRECTED COPY ATTACHED	<input checked="" type="checkbox"/>	<input type="checkbox"/>
REMARKS				PROBLEMS OR DISCREPANCIES		
(1) Report both Cs 137 and Cs 134 when by Gamma						
SHIPMENT METHOD: <i>Hand Carry</i>						
AIR BILL No.:						

RF-47989 (9/93)

Ship WHITE and YELLOW copies with samples -- Retain GREEN field copy Deliver BLUE copy to RFEDS with Datacap Transmittal	If gross alpha > 5 pci/l analyze for Ra 226 If Ra 226 > 2 pci/l analyze for Ra 226	Form: EGGRFP-081393-COCRCV.1.1
---	---	--------------------------------

Fax Results to CBogert X6783
+ RCirillo X8025

77400236

CONTRACT RTG ANALYTICAL CHARGE # CK 200

SITE CONTACT/PHONE Robert X9656 LAB/LOCATION 881

C-O-C NUMBER 902811 RFP

EG&G ROCKY FLATS, CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS	NUMBER C	MEDIA: S=	F=FILTERB	R=TURN A	OUT OF S	COOLED: T	NAOH	HNO3	H2SO4	HQ	VOA - CLP	VOA - 524	BNA - CLP	PCBS/PEST	TOTAL Met	DISS. Metals	WATER QU	NO3/NO2 a	NH3	OIL & GREAS	Ortho-Phosp	CYANIDE	COD	TOC	DOC	H2S	C.M.	8960+	
12/5/94	0930	FT30602RG	RS9	120mL G15U	1	S	U			X										X												X	
	↓	↓	↓	120mL G15U	1	S	U			X																						X	
	↓	FT30602RG	RS9	40mL G15U	1	S	U			X				X																			
	↓																																

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	LABORATORY USE ONLY
<i>Robert</i>	12/5/94 1335	<i>Hand Carry</i>	12/5/94 1335	PCKG REC'D/CUSTODY SEALS INTACT
				SAMPLE LABELS/COCs AGREE
				TEMPERATURE WITHIN SPECIFICATION
				CORRECTED COPY ATTACHED
				PROBLEMS OR DISCREPANCIES
REMARKS				
(1) INCLUDES Cs, Li, Sr, Mo, Si, Sn				
(2) TSS, TDS, Cl, F, SO4, CO3, HCO3				
SHIPMENT METHOD: <i>Hand Carry</i>				
AIR BILL NO.:				

Fax Results to Robert X6783 + R Cirillo X8025

12/09/96 DA Barnes, WJ Todino, DWRussell sampled VIRGIN
 lab entry GAC. Grab sample 1320hrs. FT20603RG
 entered by Black Carbon RFP943274 Fed-X to: [HOLD]
 13 1/8/96 CK200000 97L2039 CX Bogert
 11/28/97 Reviewed by Russ Cirillo JRC
 1/28/97 CB CX Bogert Sampling spent GAC out of drums
 D87303 FT20604RG RS9 1045hrs Grab
 0-6" RFP902817 to QDEN 1/29/97
 97L0242 CK200000 38 x 8oz glass
 pH, Reactivity, TCU VOA + metals. Rush
 2 wk TA per R. Cirillo. Samples were
 chilled w/Blue ice for delivery. Attempt
 was made to sample around the Radsoorb
 in the drum. Sampled w/stainless
 spoon. Everything cleared out by DABarnes.
 CX Bogert
 2/11/97 CX Bogert + MD Schreckengast sampling paint
 in T900C trailer. Gray paint from
 angle iron T900C-97-02-11-64-01 yellow
 paint from angle iron T900C-97-02-11-64-02
 both attached to floor of trailer.
 P.O. CB034000 to (Schuller) Lab via ASI
 IH CDC 97J1234 RUSH 3day TA
 Gray paint for: Pb, Cd, Cr Yellow for: Pb, Cd, Cr, As.
 CX Bogert
 02/25/97 CB CX Bogert + BT Walder sampling on 2 Remotes.
 Samples were taken w/stainless beaker.
 Bottles were prepreserved & pH's confirmed - except
 VOA's. Samples were chilled w/blue ice &
 delivered to the T891C lab refrigerator. pH/cond/temp
 were performed @ T891C lab. CK200000 97L0244
 GenChem. RFP902818 hand carry to QDEN
 Rads RFP943279 FedX to Thermo-NuTech (TMAN)

Sample	Location	Time	°C	pH	Cond uS/cm	Comments
FT20605RG	SW059	1020	21.0	6.5	882	
FT20606RG	SW061	1100	21.0	6.27	1415	
FT20607RG	SW132	1045	21.0	6.53	905	

cont.

1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100
 101
 102
 103
 104
 105
 106
 107
 108
 109
 110
 111
 112
 113
 114
 115
 116
 117
 118
 119
 120
 121
 122
 123
 124
 125
 126
 127
 128
 129
 130
 131
 132
 133
 134
 135
 136
 137
 138
 139
 140
 141
 142
 143
 144
 145
 146
 147
 148
 149
 150
 151
 152
 153
 154
 155
 156
 157
 158
 159
 160
 161
 162
 163
 164
 165
 166
 167
 168
 169
 170
 171
 172
 173
 174
 175
 176
 177
 178
 179
 180
 181
 182
 183
 184
 185
 186
 187
 188
 189
 190
 191
 192
 193
 194
 195
 196
 197
 198
 199
 200
 201
 202
 203
 204
 205
 206
 207
 208
 209
 210
 211
 212
 213
 214
 215
 216
 217
 218
 219
 220
 221
 222
 223
 224
 225
 226
 227
 228
 229
 230
 231
 232
 233
 234
 235
 236
 237
 238
 239
 240
 241
 242
 243
 244
 245
 246
 247
 248
 249
 250
 251
 252
 253
 254
 255
 256
 257
 258
 259
 260
 261
 262
 263
 264
 265
 266
 267
 268
 269
 270
 271
 272
 273
 274
 275
 276
 277
 278
 279
 280
 281
 282
 283
 284
 285
 286
 287
 288
 289
 290
 291
 292
 293
 294
 295
 296
 297
 298
 299
 300
 301
 302
 303
 304
 305
 306
 307
 308
 309
 310
 311
 312
 313
 314
 315
 316
 317
 318
 319
 320
 321
 322
 323
 324
 325
 326
 327
 328
 329
 330
 331
 332
 333
 334
 335
 336
 337
 338
 339
 340
 341
 342
 343
 344
 345
 346
 347
 348
 349
 350
 351
 352
 353
 354
 355
 356
 357
 358
 359
 360
 361
 362
 363
 364
 365
 366
 367
 368
 369
 370
 371
 372
 373
 374
 375
 376
 377
 378
 379
 380
 381
 382
 383
 384
 385
 386
 387
 388
 389
 390
 391
 392
 393
 394
 395
 396
 397
 398
 399
 400
 401
 402
 403
 404
 405
 406
 407
 408
 409
 410
 411
 412
 413
 414
 415
 416
 417
 418
 419
 420
 421
 422
 423
 424
 425
 426
 427
 428
 429
 430
 431
 432
 433
 434
 435
 436
 437
 438
 439
 440
 441
 442
 443
 444
 445
 446
 447
 448
 449
 450
 451
 452
 453
 454
 455
 456
 457
 458
 459
 460
 461
 462
 463
 464
 465
 466
 467
 468
 469
 470
 471
 472
 473
 474
 475
 476
 477
 478
 479
 480
 481
 482
 483
 484
 485
 486
 487
 488
 489
 490
 491
 492
 493
 494
 495
 496
 497
 498
 499
 500
 501
 502
 503
 504
 505
 506
 507
 508
 509
 510
 511
 512
 513
 514
 515
 516
 517
 518
 519
 520
 521
 522
 523
 524
 525

105

General Chemistry

[illegible]

Y
Z

100

250

Fax Results to Annant Y6763 + R. 01/11/16 x 8225

97L0247

CONTRACTOR

RTG

SAMPLERS

Report

ANALYTICAL CHARGE #

CKammd

SITE CONTACT/PHONE

06047

FAX EXT

LAB/LOCATION

OTEN

COPIES OF REPORT
1.000000

EG&G ROCKWELL ANALYTICAL CHAIN OF CUSTODY
General Chemistry

DATE/TIME
SAMPLE NUMBER
LOCATION CODE
CONTAINER TYPE, SIZE, UNITS
NUMBER OF CONTAINERS
MEDIA: S=SOIL, W=WATER
F=FILTERED, U=UNFILTERED
R=TURN AROUND RUSH
OUT OF SPEC REPORTS

COOLED TO 4°C
NAOH
HNO3
H2SO4
HCl

VOA - CLP
VOA - 524.2 com.
BNA - CLP
PCBs/PEST: CLP
TOTAL Metals-CLP(1)
DISS. Metals-CLP(1)
WATER QUALITY(2)
NO3/NO2 as N
NH3
OIL & GREASE
Ortho-Phosphate
CYANIDE
COD
TOC
pH
H2S
Cr VI
Reactivity
TCLP VOA
TCLP Metals

DATE/TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS	NUMBER OF CONTAINERS	MEDIA: S=SOIL, W=WATER	F=FILTERED, U=UNFILTERED	R=TURN AROUND RUSH	OUT OF SPEC REPORTS	COOLED TO 4°C	NAOH	HNO3	H2SO4	HCl	VOA - CLP	VOA - 524.2 com.	BNA - CLP	PCBs/PEST: CLP	TOTAL Metals-CLP(1)	DISS. Metals-CLP(1)	WATER QUALITY(2)	NO3/NO2 as N	NH3	OIL & GREASE	Ortho-Phosphate	CYANIDE	COD	TOC	pH	H2S	Cr VI	Reactivity	TCLP VOA	TCLP Metals
1/24/95	ETA0604	RS9	8025	3	W	F			X																								
1/24/95	ETA0510	RS9	8025	3	W	F			X																								

REINQUISHED BY
DATE/TIME
RECEIVED BY
DATE/TIME

LABORATORY USE ONLY
PKG REC'D/CUSTODY SEALS INTACT
SAMPLE LABELS/COCS AGREE
TEMPERATURE WITHIN SPECIFICATION
CORRECTED COPY ATTACHED
PROBLEMS OR DISCREPANCIES

REMARKS: (1) INCLUDES CS, LI, Sr, Mo, Si, Sn
(2) ISSUES OF SO4, CO3, HCO3
SHIPMENT METHOD: Fed X Hand
AIR BILL NO.:
1/24/95

SHIP WHITE and YELLOW copies with samples -- Retain GREEN field copy
Deliver BLUE copy to REEDS with Datacap Transmittal

Form: EGGRFP-081393-GWCOCCG-V1.1

RTG

Fax Results to 1330000 X 8783

2.0.0.11.1 X 8783

97L0342

Attachment 4

Assumptions Used for the Calculation of Volume, Mass and Rate of GAC Generation

ENGINEERING/SCIENTIFIC NOTE PAD



Rocky Mountain
Remediation Services, LLC.
... protecting the environment

SUBJECT:

GAL MASS/VOLUME CALCULATIONS

Project No:

GAC Disposal

Client:

DOE RFETS

Prepared By:

Hapi Salomon

Reviewed By:

Sheet:

of

1

1

Date:

6/23/97

From T3/T4, Ryans P.t, 891 (CWTF)

Inventory: 7, full waste crates (4'x4'x7')
30, 55 gal drums

Mike Pepping (generator) notes to Hapi Salomon on 6/23/97 that the waste crates are approximately 75% full and the drums are ~ 85% full.

$$7 \times 4' \times 4' \times 7' \times 0.75 = 588 \text{ ft}^3$$

$$30 \times 55 \text{ gal} \times \frac{1 \text{ ft}^3}{7.48 \text{ gal}} \times 0.85 = 187.5 \text{ ft}^3$$

$$+ \quad 775.5 \text{ ft}^3$$

Assume 775.5 $\frac{\text{ft}^3}{\text{yr}}$

Bulk density's given from MSDS are 0.25 - 0.6 g/cc

Per Scott Rooseners suggestion on 6/18/97 (meeting @ INEEL) suggest using 0.5 g/cc average bulk density.

Therefore MASS

$$775.5 \text{ ft}^3 \times \frac{0.5 \text{ g}}{\text{cm}^3} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times 2.54 \times 2.54 \times \frac{12 \text{ in}}{1 \text{ ft}} \times 12 \times 12 =$$

$$10979857 \text{ grams} = 10980 \text{ kg}$$

$$10980 \text{ kg} \times \frac{2.2 \text{ lbs}}{1 \text{ kg}} = 24156 \text{ lbs}$$

Attachment 5

Calculation of Maximum Chlorine (Halogen) Concentration

T-3/T-4 Spent GAC Chlorine Calculation from VOA sample DB00015RMDL						
compound	formula	molecular wg	mol wgt Cl	% chlorine	sample con (mg/kg)	Cl concent (mg/kg)
chloroform	CHCl ₃	119.4	106.35	89.1	76	67.7
carbon tetrachloride	CCl ₄	153.8	141.6	92.1	160	147.3
trichloroethylene	C ₂ HCl ₃	131.4	106.35	80.9	2,100	1,699.7
perchloroethylene	C ₂ Cl ₄	165.8	141.6	85.4	7,400	6,319.9
trichloroethane	C ₂ H ₃ Cl ₃	133.4	106.35	79.7	120	95.7
1,2-dichloropropane	C ₃ H ₆ Cl ₂	113	70.2	62.1	240	149.1
					tot Cl conc	8,479.3
					%Cl	0.9

The GAC from T3/T4 and Ryan's Pit source removals should contain chlorine from only one source, the chlorinated VOCs that were adsorbed on it as part of the polishing efforts in the thermal desorption treatment process. Chlorine concentration was calculated from total VOA data (sample # DB00015RM-DL) This sample represented what was assumed to be the highest VOC containing GAC. (GAC that was in the system the longest (the entire treatment operation)). This data may assist if the GAC is to be incinerated.

Signed

Hopi Salomon

Hopi Salomon

10/25/96

Attachment 6

MSDSs for Granulated Activated Carbon and Radsorb

GAC used for T3/T4 GAC + Ryans PIT

TIGG 5C AND 5D SERIES ADSORBENTS

MATERIAL SAFETY DATA SHEET

NOTE: May cover other activated carbons as listed: 8x30

SECTION 1

SUPPLIER'S NAME: TIGG CORPORATION
EMERGENCY TELEPHONE: 412-563-4300
ADDRESS: P.O. BOX 11661, PITTSBURGH, PA 15228
CHEMICAL NAME AND SYNONYMS: ACTIVATED CARBON
FORMULA: C

SECTION 2 HAZARDOUS INGREDIENTS CARBON (ACTIVATED CARBON)

CAS#: 7440-44-0
% BY WEIGHT: 100%
ORAL LD₅₀: > 10g/Kg (RAT)
TLV:
ACGIH: N/A
OSHA: N/A
OTHER: N/A

CAUTION! WET ACTIVATED CARBON REMOVES OXYGEN FROM AIR CAUSING A SEVERE HAZARD TO WORKERS INSIDE CARBON VESSELS AND ENCLOSED OR CONFINED SPACES. BEFORE ENTERING SUCH AN AREA, SAMPLING AND WORK PROCEDURES FOR LOW OXYGEN LEVELS SHOULD BE TAKEN TO ENSURE AMPLE OXYGEN AVAILABILITY, OBSERVING ALL LOCAL, STATE, AND FEDERAL REGULATIONS.

SECTION 3 PHYSICAL DATA

BOILING POINT (°F): N/A
VAPOR PRESSURE (mmHg): N/A
VAPOR DENSITY (AIR = 1): N/A
SOLUBILITY IN WATER: INSOLUBLE
SPECIFIC GRAVITY (H₂O = 1): 1.8-2.1
PERCENT VOLATILE BY VOLUME (%): 0
pH: 5.0-8.0
PACKING DENSITY: 0.4-0.5 g/cc
APPEARANCE AND ODOR: BLACK PARTICULATE SOLID

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 400 °C ASTM (DRY VIRGIN STATE)

FLAMMABLE LIMITS:

LEL: N/A
UEL: N/A

EXTINGUISHING MEDIA: FLOOD WITH WATER. IF WATER IS UNAVAILABLE, NITROGEN OR FOAM MAY BE USED TO BLANKET THE ADSORBENT BED. IF THE MATERIAL IS IN A CLOSED VESSEL, A BOTTOM INLET MAY BE BLOCKED TO DEPRIVE THE FIRE OF OXYGEN, BUT THE VESSEL SHOULD REMAIN VENTED FOR RELEASING STEAM OR OTHER HOT GASES.

SPECIAL FIRE FIGHTING PROCEDURES: WEAR PROTECTIVE CLOTHING, SELF CONTAINED BREATHING APPARATUS IF NECESSARY.

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLOODING THE VESSEL WITH WATER WILL EXTINGUISH ANY HOT ZONES. COPIOUS VOLUMES OF STEAM MAY BE GENERATED IN THE PROCESS OF EXTINGUISHING THE HOT ZONES. STEAM GENERATION IS REDUCED WHEN FLOODING OCCURS FROM THE BOTTOM UP, AS OPPOSED TO A SPRAY FROM ABOVE. THE CARBON ITSELF MAY NOT EXHIBIT FLAMING ALTHOUGH ANY COMBUSTIBLE MATERIAL IN CONTACT WITH IT WILL. AT TEMPERATURES AROUND 900 °C, CARBON CAN REACT WITH FIRE-FIGHTING MATERIALS SUCH AS WATER OR CARBON DIOXIDE TO FORM HYDROGEN AND/OR CARBON MONOXIDE WHICH COULD REACH LEVELS HAZARDOUS TO RESPIRATION OR REPRESENTING A COMBUSTIBLE OFF-GAS.

SECTION 5 HEALTH HAZARD DATA

EFFECT OF OVER EXPOSURE

A ACUTE

1. INGESTION
THE PRODUCT IS NON-TOXIC THROUGH INGESTION. THE ACUTE ORAL LD₅₀ (RAT) IS > 10g/Kg.
2. INHALATION
THE ACUTE INHALATION LC₅₀ (RAT) IS > 64.4 MG/L (NOMINAL CONCENTRATION) FOR ACTIVATED CARBON.



TIGG CORPORATION

BOX 11661
PITTSBURGH, PA 15228

TELEPHONE: (412) 563-4300
TELEX: 269312 (RCA)
FAX: 412-563-6155
CABLE: TIGGCOR PITTSBURGH



MATERIAL SAFETY DATA SHEET

SECTION I

		Product Name:	ACTIVATED CARBON, CC SERIES, KG SERIES, KP SERIES
Manufacturer:	WESTATES CARBON, INC.	MSDS Number*:	100
	2130 Leo Avenue	CAS Number*:	CAS 7440-44-0
	Los Angeles, California 90040-1634	Date Prepared:	NOVEMBER 28, 1993
Phone Number (For Information)	(213) 722-7500	Prepared By*:	MARGARET JEFFERSON
Emergency Phone Number	(800) 659-1771	Note:	Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

SECTION II - MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS - Chemical Name & Common Names (Hazardous Components 1% or greater; Carcinogens 0.1% or greater)	%*	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED
ACTIVATED CARBON	100%	2.5 mg/m ³	1.5 mg/m ³	NONE
NON-HAZARDOUS INGREDIENTS				
TOTAL	100			

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: not applicable	SPECIFIC GRAVITY (H ₂ O = 1): 0.25 - 0.60 g/cc
VAPOR PRESSURE (mm HG AND TEMPERATURE): zero	MELTING POINT: not applicable
VAPOR DENSITY (AIR = 1): not applicable	EVAPORATION RATE (_____ = 1): not applicable
SOLUBILITY IN WATER: Insoluble in water and solvents	WATER REACTIVE: non-reactive
APPEARANCE AND ODOR: Black granules without taste or odor	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT AND METHOD USED: N/A	Auto-Ignition Temperature: > 450°C ANSI/ASTM D 3468	Flammability Limits in Air % by Volume: N/A	LEL N/A	UEL N/A
EXTINGUISHER MEDIA: Water (fog or fine spray), carbon dioxide				
SPECIAL FIRE FIGHTING PROCEDURES: Avoid procedures that may stir up dust clouds.				
USUAL FIRE AND EXPLOSION HAZARDS: Avoid contact with strong oxidizers, airborne dust may be a weak explosion hazard.				

• OPTIONAL

MATERIAL SAFETY DATA SHEET

CC SERIES, KG SERIES, KP SERIES

SECTION V - REACTIVITY HAZARD DATA

STABILITY <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable	CONDITIONS TO AVOID: Contact with strong oxidizers.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizing agents	HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide Carbon Monoxide
HAZARDOUS POLYMERIZATION <input type="checkbox"/> May Occur <input checked="" type="checkbox"/> Will Not Occur	CONDITIONS TO AVOID: not applicable

SECTION VI - HEALTH HAZARD DATA

PRIMARY ROUTES	<input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion	CARCINOGEN LISTED IN	<input type="checkbox"/> NTP <input type="checkbox"/> OSSA <input type="checkbox"/> IARC Monograph <input checked="" type="checkbox"/> Not Listed
HEALTH HAZARDS	LD50 VALUES: not available	ACUTE: not available	CHRONIC: No effects from chronic exposure are known.
EMERGENCY FIRST AID PROCEDURES: Seek medical assistance for further treatment, observation and support, if necessary.			
EYE CONTACT:	Immediately flush with copious amounts of water. If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.		
SKIN CONTACT:	Wash material off the skin with soap and water. If redness, itching or a burning sensation develops, get medical attention.		
INHALATION:	Remove victim to fresh air. If cough or other respiratory symptoms develop, consult medical personnel.		
INGESTION:	Give one or two glasses of water to drink. If gastrointestinal symptoms develop, consult medical personnel (Never give anything by mouth to an unconscious person).		

SECTION VII CONTROL AND PROTECTIVE MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE): Use MSA-NIOSH approved respirator for respirable dusts, mists and fumes.	
PROTECTIVE GLOVES:	Rubber latex.
EYE PROTECTION:	Safety glasses with side shields. Contact lenses should not be worn when working with carbon.
VENTILATION TO BE USED:	<input checked="" type="checkbox"/> Local Exhaust <input type="checkbox"/> Mechanical (general) <input type="checkbox"/> Special <input type="checkbox"/> Other (specify)
OTHER PROTECTIVE CLOTHING AND EQUIPMENT:	NONE
HYGIENIC WORK PRACTICES:	Wash contacted skin areas after handling.

SECTION VIII - PRECAUTIONS FOR SAFE HANDLING AND USE/LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Wear respiratory protection during clean up. Sweep up and recover or mix material with moist absorbent for dust control and pick-up and shovel into waste container. Use detergent in spill area after clean up and flush with plenty of water.	
WASTE DISPOSAL METHODS:	Dispose of virgin (unused) carbon (waste or spillage) per local regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:	Activated carbon can be safely stored in any normal storage area, but away from direct heat.
OTHER PRECAUTIONS AND OR SPECIAL HAZARDS:	An oxygen deficiency may be created when activated carbon is stored in an enclosed space/silo. Ventilate or wear self-contained breathing apparatus. Follow all procedures for confined space entry.
NFPA Rating* Health 1 Flammability 1 Reactivity 0	HMIS Rating* Health 1 Flammability 1 Reactivity 0 Special <input type="checkbox"/>

STATE MAKES NO WARRANTIES, GUARANTEES OR REPRESENTATIONS OF ANY KIND OR NATURE WITH RESPECT TO THE PRODUCT OR ITS DATA, EITHER EXPRESSED OR IMPLIED, AND WHETHER ARISING BY LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE WHATSOEVER, WHETHER SPECIAL, INDIRECT, CONSEQUENTIAL OR COMPENSATORY, DIRECTLY OR INDIRECTLY RESULTING FROM THE PUBLICATION, USE OR RELIANCE UPON THIS DATA.

MATERIAL SAFETY DATA SHEET

RADSORB

SECTION 1 - IDENTIFICATION

MANUFACTURER'S NAME ENVIRONMENTAL SCIENTIFIC, INC.
ADDRESS 5400 SOUTH MIAMI BLVD.
MORRISVILLE, NC 27560
EMERGENCY PHONE NUMBER FOR TRANSPORTATION EMERGENCY
Call 919-941-0847
Ingestion or skin contact call ENVIRONMENTAL
SCIENTIFIC 919/941-0847
PHONE NUMBER 919-941-0847
EFFECTIVE DATE 3-30-94
CHEMICAL FAMILY Polyacrylate/polyacrylamide, crosslinked
TRADE NAME RADSORB
DOT CLASSIFICATION Not applicable
DOT HAZARD CLASS Not applicable

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	HAZARDOUS %	TLV (Units)
None	0.0%	None

SECTION 3 - PHYSICAL DATA

VOLATILITY (%)	None
SOLUBILITY IN WATER	Insoluble, but swellable in aqueous fluids.
pH VALUE	6.5 +/- 1.0
PHYSICAL FORM	Granular solid
PARTICLE SIZE	200 +/- 100 μ
MOISTURE CONTENT	<5%
BULK DENSITY	40 +/- 5 lbs/ft ³

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	Not applicable
EXTINGUISH MEDIA	Water, CO ₂ , foam, dry powder.
UNUSUAL FIRE AND FIRE HAZARD	None

SECTION 5 - HEALTH EFFECTS INFORMATION

SKIN CONTACT:	Prolonged contact may cause slight irritation due to the somewhat abrasive powder.
EYE CONTACT	May cause slight irritation and swelling of mucous membrane.
INHALATION:	May cause irritation to the respiratory tract and lungs.

RADSORB MSDS continued

FIRST AID:

SKIN CONTACT: Wash with soap and water.

EYE CONTACT: Rinse with plenty of water for at least 15 minutes. If discomfort continues, seek medical attention.

INHALATION: Remove to fresh air. If discomfort continues, seek medical attention.

INGESTION: If discomfort continues, seek medical attention.

SECTION 6 - REACTIVITY INFORMATION

STABILITY:

Stable.

INCOMPATIBILITY:

Strong oxidants; e.g., sodium hypochlorite.. alkalies and acids

HAZARDOUS POLYMERIZATION:

Will not occur.

CONDITIONS TO AVOID:

Keep from getting damp or wet, until ready to use .

THERMAL DECOMPOSITION PRODUCTS:

In the event of combustion CO, CO₂, NO_x may be formed.

Do not breathe smoke or fumes, Wear suitable protective equipment.

SECTION 7 - PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION

Not required under normal use conditions. If significant dusting occurs, wear NIOSH approved dust respirator.

VENTILATION

If significant dusting occurs, local exhaust ventilation is recommended.

OTHER PROTECTION

No special precautions. Avoid eye and skin contact, and inhalation of dust.

SECTION 8 - SPILL AND DISPOSAL

SPILL CONTROL AND RECOVERY:

SOLID SPILLS

Sweep up and place in reclaim or disposal container. Wear protective equipment specified in Section 7.

DISPOSAL

Radsorb is not a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261; it does not have characteristics of Subpart C, and it is not listed under Subpart D. Radsorb is a non-hazardous solid waste and can be disposed of by incineration or in a sanitary landfill in accordance with local, state and federal regulations.

SECTION 9 - TRANSPORTATION INFORMATION

DOT SHIPPING NAME/HAZARD CODE:

Radsorb is not regulated during transportation.

RADSORB MSDS continued

SECTION 10 - REGULATORY INFORMATION

TOSCA:	Radsorb does not contain ingredients (at a level of 1% or greater) on the List of Toxic Chemicals.
FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15:	Radsorb does not contain ingredients specifically listed.
CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112: Act.	Radsorb does not contain ingredients covered by the Clean Air Act.
CALIFORNIA PROPOSITION 65:	Radsorb does not contain chemicals on the current Proposition 65 list.
MICHIGAN CRITICAL MATERIALS:	Radsorb does not contain ingredients listed on the Michigan Critical Materials Register.

SECTION 11 - USER'S RESPONSIBILITY

This Radsorb material safety data sheet provides health and safety information. Radsorb is to be used in applications consistent with our product literature. Individuals handling Radsorb should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations. Please consult your ESI sales representative for further information.

SECTION 12 - STORAGE

STORAGE	Keep material in a dry location and sealed to minimize water absorption before use.
---------	---

Attachment 7

**RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring
Results**

RADIOACTIVE WASTE VARIANCE REQUEST

RWVR No. **96-04**

Section 1 (To be completed by the Initiator)

Initiator Name Hopi Salomon	NA Employee Number	T893B Building	Accelerated Actions Department	6627/5129 Phone/Page	9/13/96 Date
---------------------------------------	-----------------------	-------------------	--------------------------------------	-------------------------	-----------------

Description of Variance (include specific requirements for which variance is being requested):

Package granulated activated carbon (gac) which has been used on the T3/T4 project and is now spent. The waste contains D coded organics, some F-listed components (from Ryan's Pit remediation) and small amounts ($\approx 60 \mu\text{Ci/g}$) U^{238} . We request that the waste be able to be packaged in 4'x4'x7' wooden waste crates for which we need a variance from W.O. 11-01¹⁰ W.O. - 1101. (which requires white 55 gal drums).

Justification for Variance (describe why variance is being requested and any action to be taken):

Per. Joe Molter, (RWRS) Doug Parker (Dyncorp Traffic), Ken Lennarck (Dyncorp traffic) these 4'x4'x7' waste crates are appropriate shipping containers for spent GAC. Also, these containers take up less space when being stored, and are more appropriate than drums for bulk storage.

Scope of Variance (describe the extent to which the variance is applicable - i.e., time frame, affected drum numbers):

The spent GAC has already been loaded, but will not be sealed up until this variance is approved. The waste is currently in the following waste crates: P02172, P02173, P02174, P02175, P0212, P0213, P0214, P0215, P0216, P02243, P02245; and the following drums: D87118, D87113, D87117, D87119, D87121, D87122, D87126, D87128, D87130, D87132. The waste crates will be evaluated for VOA emissions after they are sealed in accordance with 40 CFR 60 Appendix A, Method 21, "Determination of Volatile Organic compound leaks". This waste is expected to be incinerated at INEL WERF or Oak Ridge incinerator.

After completion of Section 1, submit form to Radioactive Waste Programs, Building T130C.

Section 2

Variance Disposition (circle one):

Approve

Reject

Approvals:

[Signature]
Radioactive Waste Programs

[Signature]
Waste Certification Programs

Comments:

Place copy of this variance with W/RT documentation for all affected containers/packages. Jgk

Survey of Waste Crates 9-23-96 ~ 13⁰⁰ 1530, Peggy
Schueckengast, Health+Safety Supervisor, T3/T4 Project.
Instrument - Photo ionization detector equipped
with an 11.7 eV lamp, which will detect
all suspect VOCs. It is calibrated with
100ppm isobutylene. It detects down to 0.1 ppm.
Response factors for the compounds of concern
range from 1/10 to 2 x ^(or 10 to 0.5) the reading.
Instrument range is 0.1 - 2000 ppm.
Sample probe = 1/4" internal diameter.
Instrument response time is less than 30
seconds (approximately 10 seconds).

Instrument was calibrated this morning
by Wade Russell, RTG. On a 100ppm
isobutylene standard, the instrument read
104 ppm.

Survey performed in accordance with
40 CFR, Part 60, App. A, Method 21.

Waste Crates:	Reading
PO2172	0ppm above background at
PO2173	all wood joints.
PO2175	↓
PO2174	

4x4x7 Waste Crates - sealed, banded,
containing spent GAC with high VOC levels

9-24-96 Fred Kerchner monitored the following crates on
9-24-96. The same instrument was used, and was
calibrated as detailed above.

PO 2245

PO 2243

PO 2176

MD. Schueckengast